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PERIPHERAL NERVE TRANSPLANTATION,

WITH THE REPORT OF A CASE IN WHICH THE SCIATICS OF A DOG WERE TRANSPLANTED SUCCESSFULLY BETWEEN THE SEVERED ENDS OF THE MEDIAN AND ULNAR NERVES OF A MAN.*

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The operation of implanting between the resected ends of a peripheral nerve a segment of a nerve from a recently amputated limb or from one of the lower animals is comparatively rare. In the majority of cases of accidental impairment of the conductivity of a peripheral nerve the proximal and distal fragments can be brought together and directly sutured. Obviously this is the ideal method, and that, oftentimes, it is markedly successful may be seen from the reported cases of apparent primary union occurring after immediate suturing of the divided nerves.

In a certain proportion of cases, however, so much of the nerve-substance will be removed as to preclude all chance of a direct union of the divided ends of the nerve-trunk. This will happen more often during the removal of tumors involving a peripheral nerve. The same condition may result from an extensive crush of the nerve-substance, necessitating the resection of considerable portions of the nerve before healthy tissue is reached, or the injured nerve may be so embedded in dense connective tissue as to render a dissection at the point of the lesion exceedingly difficult and of doubtful utility.

* Inaugural thesis read before the Chicago Academy of Medicine, May 13, 1898.

Under these conditions the surgeon must decide what method of bridging over the gap in the nerve-trunk and restoring its conductivity shall be employed. His choice will naturally depend largely upon the recorded results of other operators, including experimental as well as actual work on the human subject. Deductions from the cases of nerve transplantation will be rendered difficult from the small number recorded, from the meagreness of the reports and the absence of the very details needful to the settling of certain mooted questions.

To observe, treat, and record intelligently a case of nerve section requires a knowledge of nerve physiology and histology rarely possessed by the average surgeon. It is only by the combined efforts of specialists in these departments that such cases of nerve surgery can be worked out to the greatest advantage.

If the present paper shall prove to be of any scientific value I feel that it will be due largely to the assistance of my friend, Professor G. Carl Huber, of the University of Michigan, whose splendid work on nerve degeneration and regeneration is so well known.

History of the Case. The patient, the report of whose case forms the basis of the present article, was referred to me by his brother, Dr. A. G. Graybill, of Caledonia, Mich., to whom I am indebted for accurate notes taken from time to time at my request.

N. G., male, aged twenty-four years, on May 17, 1896, sustained a severe injury to the right wrist by coming in contact with a circular saw, the cut extending transversely across the wrist and nearly to the bone. The ulnar artery and a number of the flexor tendons were severed and immediately sutured by the local surgeon, who assured the patient that the nerves were uninjured and that in time he would regain full use of his hand. The wound was dressed ten days after the operation and found to be suppurating. For a time the wound was dressed every day, and up to the time of consulting his brother, some four months after the injury, had not healed. The patient had no feeling in the hand, and at first complete loss of muscular movement. After awhile he was able to close his hand, but not well. Sensation did not improve, and his fingers began to draw upward, and he was unable to straighten them. Finally sores began to appear upon the fingers, and becoming alarmed he travelled many miles in order to place himself under his brother's care.

My first examination of the case was on September 21, 1896. The patient was a remarkedly well-developed and muscular man. About 7 cm. above the right wrist was situated an irregular cicatrix. On the ulnar side of the forearm it was depressed and adherent. There was a longitudinal cicatrix on the ulnar side of the forearm, extending from 2 cm. above the depressed cicatrix to the wrist. About 3 cm. above the wrist, over the normal site of the median nerve, was a superficial sinus, from which a small quantity of pus could be pressed. The flexor tendons were contracted and bound down by cicatricial tissue. (Figs. 1 and 2.) Accompanying this contraction was a flexure of the fingers which could not be overcome by passive motion.

The trophic changes in the hand were marked. It was distinctly

colder than the left, its color dull red, surface smooth and glossy, and nails corrugated. There were a number of blebs the size of a pea scattered over the dorsal surface of the third and fourth fingers. A superficial ulcer, 1½ cm. in diameter, existed at the root of the nail of the third finger. (Fig. 1.) There was a marked atrophy of the small muscles of the hand, and the thenar and hypothenar eminences were considerably flattened. The interosseous spaces were also markedly furrowed. The hand could be closed only partially, there being inability to bring the finger-tips into the palm. Abduction and appo-

FIG. 1.

Showing trophic changes. Taken four days prior to operation.

sition of the thumb were impossible, an object in the hand being grasped only through the agency of the long flexors. Extension of the fingers was rendered doubly impossible by contraction of the flexor tendons and atrophy of the interosseous and lumbricales muscles.

The area of anæsthesia was tested by the induced current and by a pin-prick. There was absolute anæsthesia in the palmar surface of the hand, over all the digits and inner surface of the thumb. The ulnar side of the hand was anæsthetic. On the dorsal surface the skin was anæsthetic over the entire distal half of the first three digits, over the ulnar half of the proximal part of the third digit, and over the entire

surface of the small digit and a corresponding area downward to the wrist. There was a small border of anæsthesia on the radial side of the proximal half of the first finger and the outer surface of the thumb. (Figs. 3 and 4.)

The patient was directed to return home and have the suppurating tract treated daily with peroxide of hydrogen until it was entirely healed, as it was considered useless to attempt anything operative upon the severed nerves save in a clean field. On October 17th, the wound having healed entirely, he was seen in consultation by Professors Herd-

FIG. 2.

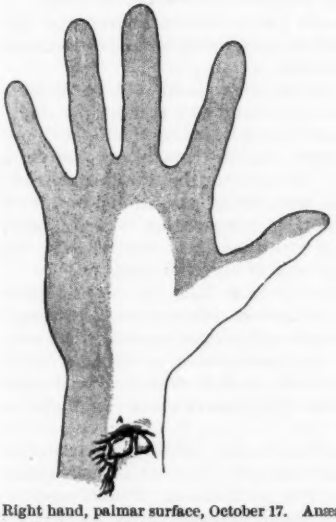
Taken two and a half months after operation.

man and Huber, of Ann Arbor. The former kindly subjected the hand to a very careful electrical examination, as follows: Examination with Waite & Bartlette high-tension induction coil, secondary in use, four interruptions per second, with secondary coil, carrying the primary to the extent of 25 millimetres. With a flat electrode one and a half inches in diameter at the back of the neck, and a pointed electrode over the nerves at the elbow-joint, responses were obtained from the left ulnar and median nerves. With electrodes in the corresponding position on the right arm it was necessary to move the secondary

coil from 25 to 33 millimetres to obtain some response. With pointed electrodes on the nerves and muscles in the palm there was no response. The anæsthetic area was carefully noted by the induced current, and corresponds to that noted in Figs. 3 and 4. *Continuous current examination.* In muscles supplied by the median, a current of ten milliampères being used, the response was sluggish and wormlike. A. C. C. greater than C. C. C. The same condition existed for the muscles supplied by the ulnar. Reaction of degeneration, therefore, was shown to be present in the hand-muscles supplied by these two nerves.

Operation, October 24, 1896, five months after the injury. At the time of the operation the trophic changes on the fingers were still marked, and rendered complete asepsis of the wrist somewhat difficult. The fingers were wrapped in iodoform gauze and cotton, but the wrappings became deranged at the time of the operation, and possibly accounted for the superficial suppuration of the wound over the median nerve.

FIG. 3.



Right hand, palmar surface, October 17. Anæsthetic area shaded. A. Location of scar.

FIG. 4.

Dorsal surface, October 17.

The hand was rendered bloodless by an Esmarch bandage, and an incision 7 cm. long was made over the normal site of the median nerve. (Fig. 2.) The flexor tendons were found to be very adherent and contracted. The cut median was located after a little searching. It was considerably thicker than the normal nerve, and its two ends were united by a small band of dense connective tissue. (Fig. 9.) The proximal end of the median ended in a hard bulb 2½ cm. in length and 2 cm. in width. In order to expose the nerve-tissue at the proximal and distal ends, and to get rid of all connective tissue, the bulb above and a portion of the nerve below were removed, the whole fragment, including the connective-tissue bridge, measuring 3½ cm. So much

force was required to bring together the cut ends that it was decided best to fill in the gap with a dog's nerve.

A young black hound had been aseptically prepared, and 4 cm. of the right sciatic were removed and sutured between the resected ends of the median with kangaroo tendon. A fine curved needle was used, and two sutures passed ½ cm. away from the ends and carefully tied. The fascia was sutured over the transplanted fragment, and the flexor tendons loosened as much as possible. The skin was sutured with catgut, a few strands of silkworm-gut being used for drainage. An incision 7 cm. long was now made over the normal site of the ulnar nerve. Considerable difficulty was experienced in locating the incised nerve, from the fact that the upper fragment was joined to the distal fragment of the severed carpi ulnaris tendon. The distal end of the ulnar nerve was found lying slightly below and interior to the proximal end. The two ends were trimmed as in the case of the median, and 4 cm. of the left sciatic of the dog transplanted between the ends, as previously described. The fascia was sutured over the fragment with catgut and the incision closed in the same manner as was that of the median. A plain sterilized dressing was placed over the wounds and arm, and the hand placed in a posterior splint, the fingers being extended as much as possible and held in place by a bandage.

The day following the operation there was considerable oozing, and the dressings were changed, affording an opportunity of testing the anæsthetic area on the thumb. The other fingers, being bandaged and forcibly extended upon the splint, were not disturbed, and therefore their sensory areas were not tested. The test on the thumb was made with the point of a pin, the patient's eyes being closed. Comparison with the anæsthetic area, indicated in Fig. 3, according to tests made before the operation, showed a distinct return of the sensation over the palmar side of the thumb to the distal end of the first phalanx.

Three days after the operation the patient left the hospital and returned to Caledonia, where he was under the constant medical supervision of his brother, who made frequent and accurate notes of his condition. The wound was dressed for the second time on October 27th, and two days later a third time, when the median wound showed signs of superficial suppuration, although the temperature was normal, and so remained.

October 31*st*, seven days after operation, fourth dressing, ulnar wound healing by first intention. Several stitches over the median have given way. Considerable oozing from the line of incision. Splint omitted and fingers forcibly extended without much difficulty or pain. Sensation: Detects the prick of a pin over the palmar surface of the thumb as far forward as the second phalanx. Slight irritation of this area produces prickling sensation of the hand, extending up the hand and wrist to the wound.

November 1*st*. Detects the prick of a pin on the first finger, dorsal surface, to the root of the nail, and over the dorsal surface of the second finger to the middle of the second phalanx.

2*d*. Ulnar incision healed by first intention. Slight superficial suppuration in the median incision. Detects the prick of a pin over the entire dorsal surface of the third phalanx of the second finger.

4*th*. Detects prick of pin or pencil over the dorsal surface, palmar side, of the hand to the end of the second phalanx of little finger, and

previously anæsthetic area of the ulnar side of the third finger to the end of the second phalanx. The hand is much warmer than before the operation.

6*th*. Sensation over the whole of the dorsal surface of the thumb to the nail on the palmar surface, and on both sides of the thumb sensation exists to within 2 cm. of the end of the thumb. Sensation over the dorsal surface of the first finger to the nail and on the sides and palmar surface to the end of the first phalanx. Sensation on the dorsal surface of the second finger and the ulnar side of the second finger to the end of the third phalanx. Over the corresponding area on the palmar surface of the same finger a pin-prick could be detected to the end of the second phalanx. There was no sensation on the ulnar side of the palmar surface of the finger. In the third finger sensation was good on the dorsal end of the first phalanx. On the dorsal surface toward the second finger there was partial sensation to the end of the second phalanx; sensory area of the dorsal surface of the little finger extended to the end of the second phalanx. No difference is to be noticed in sensation when a pin, pencil, or electrical current is used. Anæsthetic areas of the hand are colder than the sensory areas. No response of the muscles to the faradic current.

8*th*. Area in the palm of the hand which was distinctly sensitive to a pin-prick at a previous examination is anæsthetic to-day.

9*th*. Hand has a natural color on the dorsal surface, with the exception of the third phalanx of the second, third, and fourth fingers. Can almost completely extend the first finger. The ulcers have healed. There is a decided improvement in the muscular power of the hand. Can touch the dorsal surface of the second knuckle of the first finger with the end of the thumb. Can approximate the thumb to the end of the second finger easily, and to the third finger with some difficulty. These movements were hitherto impossible. Can abduct the thumb more daily. Can hold a tin wash-basin between the thumb and forefinger, while before the operation it was impossible to hold as light an object as a lead-pencil. Can detect degrees of heat and cold with the dorsal surface of the hand, a match flame being felt at a distance of two inches and heat from a stove at six inches.

The hand was treated daily with massage and electricity, and improvement in sensation and motion was very satisfactory. The changes in sensation have been noted on the charts.

December 31, 1896. There is a blister 1 cm. in diameter, and another one-quarter as large, on the palmer surface of the third phalanx of the first finger. The skin of the entire hand has lost its shiny look, and appears quite normal. The fingers have lost their puffy look. The nails are growing out and the ridges are disappearing. The improvement in the muscular power is very marked. The tips of the fingers can be closed into the palm. Opposition and adduction of the thumb improving, although adduction is impossible without flexion of the thumb. Can hold a pencil between the thumb and fingers so tightly as to require considerable force to withdraw it from his hand. The first finger can be nearly fully extended; the others are held by the contracted flexor tendons. There is still atrophy of the interossei and the muscles of the thenar and hypothenar eminences, although these depressions are much shallower than before the operation.

Patient left Caledonia for Canada, January 28, 1897. He was satis-

fied that he could earn his living by manual labor, and, with the exception of the contraction of his fingers, claimed his hand was as good as ever. His grip was strong, and he could perform such tasks as chopping wood. Sensation was complete over the entire dorsal surface of the hand excepting over the third phalanges of the second, third, and fourth fingers. The only remaining anæsthetic areas of the palmar side of the hand were over the second and third phalanges of the third and fourth fingers and the third phalanx of the second finger.

FIG. 5.

Palmar surface, November 8.

FIG. 6.

Dorsal surface, November 8.

He went to work in the saw-mill, and some time in February, 1897, unfortunately froze the right hand. He persisted in working, however, and one week later again froze the hand, this time so badly that the swelling extended half-way to the shoulder. Five months later the hand had practically returned to its condition at the time of the frostbite, with the exception of the extremities of the first and third fingers, where there were sinuses continually discharging pus. There was also loss of sensation over the last phalanx of the first finger, although this area had become sensory after the operation. Eight months after the frostbite the distal phalanx of the first finger was amputated and also the second and third phalanges of the third finger, the amputation wounds healing well.

The condition of the hand on January 1, 1898, was as follows: Sensation is complete in the hand, except a small area between the last joint and the nail on the dorsal surface of the second and little fingers. The palmar surface of the hand and fingers is sensitive to the slightest touch with a feather. Sensation of heat and cold as good as ever. Some atrophy of interossei and muscles making up the thenar and hypothenar eminences. Motion of the hand good and strong. From lack

of exercise of the hand resulting from frostbite there was increased contraction of the flexor tendons, especially those of the little finger. Cannot adduct or abduct the thumb; neither can the fingers be separated or brought together.

Under date of April 21, 1898, the patient writes: "My hand is good and strong, but my second finger is bothering me the same as the other two did. The hand is not filling out between the fingers. Sensation is good in the whole hand and fingers, except the dorsal surface of the second finger to the first joint. The end of the finger continues sore, and may have to have it amputated as far as the first joint. I am hard at work every day."

FIG. 7.

Palmar surface, December 31.

FIG. 8.

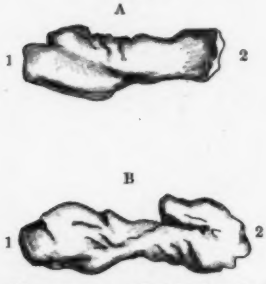
Dorsal surface, December 31.

Fig. 1 was taken before and Fig. 2 after the operation. The changes in sensation have been outlined in Figs. 3 to 8. Sensation was tested by means of a pin-prick. Careful comparison of the notes of change of sensation after the operation and the charted areas will show variations of the sensory areas, a part sensory at one time becoming anæsthetic at a subsequent date. This "vacillating sensation" will be considered later on.

Microscopical Examination by Dr. G. Carl Huber of Segments of the Median and Ulnar Nerves Removed at the Time of the Operation. The segments removed from the median and ulnar nerve at the time of the operation (the size and shape of which may be ascertained in Fig. 9) were sent me in Müller's fluid. After thorough hardening in this solution and dehydration in alcohol the tissues were prepared for paraffin embedding by cutting them into several smaller pieces. The manner of their subdivision may perhaps be shown best by means of the accompanying Fig. 10, where *c* and *p*, respectively, are used to designate the central and peripheral end of *Med* (median segment) and *Ul*

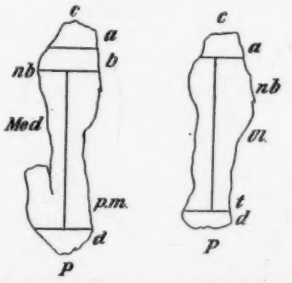
(ulnar segment); *nb*, the nerve-bulbs of median and ulnar central ends; *pm*, peripheral median, and *t*, a portion of the forearm tendon to which the ulnar was attached; *c*, a connective-tissue bundle uniting the bulbs on the peripheral end of the central median stump (*nb* in *Med* of figure) to the central end of peripheral median (*pm*, of figure), and the bulbs on the peripheral end of the central ulnar (*nb* in *Ul* of figure) to the tendon. The lines in Fig. 10 indicate the position and directions of the sections by means of which the segment removed from the median nerve was divided into five smaller pieces, the segment from the ulnar into four pieces. The pieces thus obtained were embedded in paraffin and sectioned, the sections varying from 8 to 15 μ. in thickness. It may readily be seen that in this way cross-sections of the central end of the median and ulnar segment, as also cross-sections of the peripheral median and the tendon attached to the ulnar (*a*, *b*, and *d*, of Fig. 10), and longitudinal section of the tissue between these respective cross-sections were obtained.

FIG. 9.



A. Ulnar nerve. 1, Proximal end; 2, tendon. B. Median nerve. 1, Proximal end; 2, distal end.

FIG. 10.



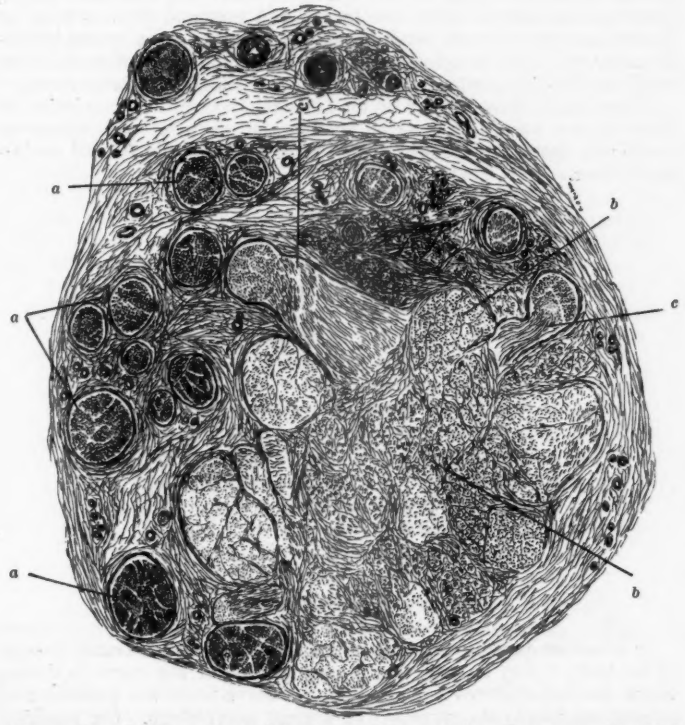
Median and ulnar segments, showing division into smaller pieces, as mentioned in the text.

The sections thus obtained were fixed to cover-glasses, the paraffin removed, and representative sections from each of the several pieces, obtained as above described, were stained after the following methods:

1. Hæmatoxylin, counter-stained with eosin.
2. Hæmatoxylin, counter-stained with picric-fuchsin.
3. Stroebe's anilin-blue-saffranin method for bringing to view the axis cylinders. For some unexplainable reason the sections stained in this way did not show with the usual clearness the axis-cylinder differentiation; with care, however, they could be distinguished from the surrounding tissue when the oil immersion was employed.
4. Weigert's hæmatoxylin stain as modified by Benda. It was found that this method could be used on sections cut in paraffin, the myelin staining in the well-known blue-black color. The paraffin sections, after fixation to the cover-glasses and removal of the paraffin, were placed from four to five days in Müller's fluid; were then impregnated with the iron salt (liq. ferri tersulphatis one part, to two parts of distilled water) for twenty-four hours, stained in 1 per cent. aqueous solution of hæmatoxylin for forty-eight hours, bleached in a ½ per cent. solution of permanganate of potassium, and finally in a 10 per cent. solution of

hydric sulphite, washed in water, dehydrated, cleared in xylol, and mounted in balsam. By the use of these several staining methods the general structure of the tissues was studied to some extent, and the development of new axis-cylinders and the myelation of the new fibres and the myelin of the old fibres were brought to view.

FIG. 11.



Cross-section of bulb on the peripheral end of the central median stump. Magnified twenty times; reduced about one-half. *a*. Normal nerve funiculi. *b*. Bulb-tissue. *c*. Nerve funiculi consisting of new nerve-fibres cut obliquely.

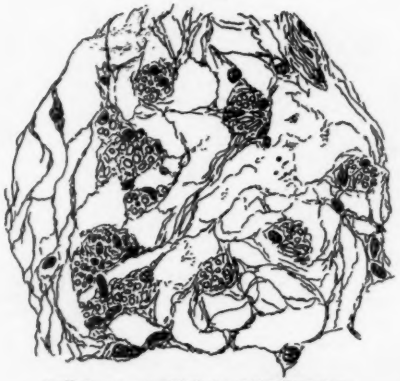
Microscopical Appearance of Sections made from the Segment Removed from the Median.

Cross-sections of the central portion of the median segment (*a*, of Fig. 10) show in all essentials the structure of a normal nerve-trunk, with this exception—the nerve funiculi are separated by a larger amount and by a more dense fibrous tissue—epineurium—than is the case in a normal nerve-trunk. The nerve-fibres in the funiculi present nothing worthy of special mention, showing in all essentials the structure of a normal nerve-fibre. Cross-section through the bulk of the central median (*b*, of Fig. 10) present, however, an entirely different appearance. One such section is reproduced in Fig. 11. As may be seen from this figure, one

side of the section showed a number of normal nerve funiculi (*a*), each surrounded by epineurial sheath and separated by a rather dense epineurium. The greater portion of the section presents, however, a very characteristic structure—one which may be referred to as the structure of a nerve-bulb. In its most characteristic appearance (see *b*, of Fig. 11, and more highly magnified in Fig. 12) it presents a loose areolar connective tissue, in the meshes of which are seen small nerve-bundles, consisting of from two to ten and now and then as many as sixteen to eighteen small nerve-fibres, which have a more or less irregular wavy, tortuous, or spiral course, the individual nerve-fibres in these small bundles being often separated by a few connective-tissue fibres.

These small fibres consist of an axis-cylinder, and the majority of them have a very thin layer of myelin, and are beset with numerous nuclei; in short, they present the appearances of newly formed medullated fibres.

FIG. 12.



Bulb-tissue magnified about 900 diameters.

In a section passing through a funiculus of the nerve-trunk, central to the bulb, it may be seen that in that portion of the nerve funiculus which did not undergo degeneration the nerve-fibres are parallel and present essentially the structure of normal nerve-fibres. On reaching the beginning of the bulb-tissue the nerve-fibres assume the character of newly formed nerve-fibres (very small nerve-fibres, with only a thin layer of myelin and many nuclei); at the same time these smaller fibres begin to spread out fan-shaped, and sooner or later break up into small bundles, which are no longer parallel, but may be seen twining their way between the connective-tissue bundles of the bulb. Oftentimes large bundles are deflected from their course, as may be seen in the cross-section presented in Fig. 11, where at *c* such bundles are cut obliquely and longitudinally.

Peripheral Median. Cross-sections of the central end of the peripheral median present the following appearances: The nerve funiculi are separated by a relatively large amount of fibrous connective tissue which is much denser than the epineurium of a normal nerve-trunk. In preparations stained with hæmatoxylin and eosin or picric fuchsin

all the nerve-fibres constituting these funiculi present the appearances of completely degenerated nerve-fibres — that is to say, collapsed sheaths of Schwann containing a small amount of the nucleated protoplasm. When, however, such cross-sections are stained in Weigert's hæmatoxylin it may be seen that here and there among the degenerated fibres some regenerated fibres, with a very thin sheath of myelin, are to be found. I have represented in Fig. 13 a nerve funiculus sketch from a cross-section of the peripheral median stained in Weigert's hæmatoxylin. In this figure only the medullated nerves are regenerated. The sketch was made with the aid of the camera lucida, and shows not only the number and arrangement of these small, medullated fibres, but also shows that while many are cut crosswise, others are cut obliquely, showing that some of these regenerated fibres in the peripheral median have an irregular course and are winding their way along paths of least resistance. In cross-sections of the peripheral median stained after the Stroebe method, here and there a small axis-cylinder may be made out. These sections show, therefore, that in the peripheral median a certain number of regenerated fibres are to be found among the completely degenerated nerve-fibres.

FIG. 13.

Cross-section of a funiculis of the peripheral median, stained in Weigert's hæmatoxylin. Only the medullated fibres are shown. Magnified about 250 diameters.

Longitudinal sections of the median segment (made as above described) present appearances worthy of more especial consideration. Reference has above been made to the structure of the peripheral and of the central median, namely, the nerve-bulb, consisting of newly formed nerve-fibres, many of which had a thin sheath of myelin grouped into small bundles and separated by an areolar connective tissue. Between this nerve-bulb and the peripheral median there is found a dense fibrous tissue (*c*, in Fig. 10). Into this connective tissue could be traced from the nerve-bulb small medullated nerve-fibres, well shown in Weigert's stained sections. They were found here and there in this tissue, either as single fibres or as small bundles of fibres, which could be traced into the peripheral median stump; and, while it was not possible in any one longitudinal section to trace a single newly formed medullated fibre, or a small bundle of such fibres, from the nerve-bulb on the peripheral end of the central median stump through the connective tissue intervening between it and the central end of the

peripheral median and into the peripheral median, owing to the fact that these small medullated fibres do not follow a straight course, because they are compelled to wind their way through the organizing connective tissue, taking in this paths of least resistance between connective-tissue bundles, this would not go to show that the fibres found in the peripheral median did not grow into it from the central stump. Their arrangement in these longitudinal sections suggests this downgrowth very strongly, and may be interpreted as showing that some of the budding axis-cylinder processes of the central end had developed far enough toward the peripheral median to be able to grow through the connective tissue forming between the central and peripheral portion of the divided median, and thus reach the peripheral median. How far down in the peripheral median such fibres had grown at the time of the operation can only be conjectured.

Ulnar. The study of the segment removed from the ulnar loses in interest owing to the fact that the central end of the peripheral ulnar was lost at the time of the operation. As has been previously stated, the peripheral end of the central ulnar segment was, at the time of the operation, found united to one of the forearm tendons, to which it seems to have been sutured at the time of the injury. The segment of the ulnar sent me for examination consisted, therefore, of the peripheral portion of the central ulnar stump, firmly united by fibrous tissue to a short segment of tendon. Cross-sections of the central end of the ulnar segment (*a*, of Fig. 10) presented appearances very similar to that described for the central median segment and shown in Fig. 11, and need, therefore, no further description. Cross-section of the peripheral portion of the segment removed from the ulnar (*c*, of Fig. 10) shows, for reasons above given, the structure of the tendon. Longitudinal sections of the ulnar segment (along the line shown in Fig. 10) show the ulnar ending in a large nerve-bulb, which was intimately united to the tendon by means of fibrous tissue. In none of these sections was I able to trace any newly formed nerve-fibres beyond the nerve-bulb, the dense structure of the tendon to which the ulnar was probably sutured at the time of the injury preventing the downgrowth of the axis-cylinders from the central ulnar stump.

Microscopical Examination of Amputated Fingers (by Dr. G. Carl Huber). The tips of the two fingers, the third phalanx of the first finger, and the second and third phalanges of the third finger were sent me in alcohol. Pieces from various places in the amputated fingers were embedded in paraffin, sectioned, and the sections fixed to cover-glasses and stained in hæmatoxylin and eosin-hæmatoxylin and Van Giesen's picric acid, acid fuchsin solution, hæmatoxylin, and orange G. Attempt was also made to stain them after Weigert's hæmatoxylin method and some of the methods for differentiating the axis-cylinders in the nerve-fibres; but, owing to the fact that the tissues were hardened in alcohol and not in a chrome salt, these latter methods did not prove satisfactory.

In sections prepared after the above methods it may be seen that the tissues other than the nerve-fibres and end-organs to be mentioned, present, as far as may be determined, a normal structure. Epidermis and sweat-glands are all normal, as is also the dermis. Yellow elastic tissue, as shown by the orcein method, is normal in amount and distribution. The great majority of the vessels present no deviation from the normal structure, with the exception of one of the digital arteries found in the

volar side of the third finger. This vessel, as seen in cross-section, presents on one side a very much thickened subendothelial coat. The nerve-trunks, both palmar and dorsal, as also the smaller branches here and there met with, present at first sight the appearance of completely degenerated nerves. The epineurial tissue is thicker and denser than in a normal nerve of the same size. The same is true of the perineurium surrounding the several funiculi. The structure of the nerve-fibres is most clearly seen in a number of small branches cut obliquely in for a short distance longitudinally. In these sections it may be seen that such degenerated fibres consist of a very small amount of homogeneous protoplasm in the form of a thread or very delicate band surrounded by a very delicate sheath. In the course of these fibres, rod-shaped or spindle-shaped nuclei are met with at intervals of about 75 to 100 m. In cross-sections such degenerated fibres present the appearance of a very small tube filled with a homogeneous substance. They are separated in the funiculus by a small amount of fibrous connective tissue. Among the degenerated fibres a few somewhat larger fibres are met with which measure about 5 m. in diameter. These fibres consist of a delicate sheath filled with a homogeneous substance. Sections were stained after the Weigert hæmatoxylin method as modified by Benda, in order to determine whether these larger fibres possessed a medullary sheath. In none of the sections made were medullary fibres found. Neither was I able to make out with any degree of certainty an axis-cylinder in any of the larger or smaller fibres. In qualification of the above statements it should be stated that as these tissues were hardened in alcohol, and not in one of the chrome salts, it is very probable that neither the Weigert method nor the special methods for staining the axis-cylinder were of any value in determining whether a medullary sheath was present or absent in the nerves examined. Negative results where these methods cannot be followed are of very little value. Mention may be made of the appearances of a number of Paccinian bodies seen in the sections. These nerve-endings were normal in structure except that no nerve-fibres could be made out in the core.

While it is not within the scope of this paper to discuss exhaustively the different views which have been advanced in explanation of the process of regeneration of peripheral nerves, in order to interpret intelligently the various phenomena presented by the case under consideration, it will be necessary to state briefly the main theories entertained regarding the manner of the regeneration of a divided nerve. I would refer those desiring a more exhaustive discussion of the subject to a recent article by Kennedy,[1] whose bibliography is quite complete.

In the article referred to, Kennedy divides the views of the histologic process of regeneration into two groups:

1. The view established by Ranvier,[2,3] and closely coinciding with that of Waller, that the peripheral segment of the nerve takes no part in the process of regeneration, but that the latter is effected entirely by growth of the new axis-cylinders from those of the central end of the nerve, the peripheral segment acting merely as a guide or growth to the end-organs. This view is widely accepted, and is supported by the

histogenetic researches of Kölliker[4] and His.[5 6 7] It has been recently supported by Howell and Huber,[8] Stroebe[9] and Notthafft,[10] who, however, find that the envelopes of the axis-cylinders are supplied from elements in the peripheral segment.

2. The view that the new fibres are derived from elements in the distal segment, and that the young fibres thus formed become attached to the fibres of the central end, and thus restore conductivity. Recently Bunger [11] has adopted this view, and holds that the young fibres are derived from the protoplasm and nuclei of the interannular segments. These form spindle-cells which unite end to end and form protoplasmic threads, which soon show longitudinal striation, the beginning of the axis-cylinder. The new myelin sheath is formed from the outer layer of the young fibres and also partially by absorption of the old myelin. The old sheath of Schwann disappears and the new is derived from the endoneurial tissue. The nuclei of the new sheath of Schwann are the direct descendants of the nuclei of the old, and have clearly the value of neuroblasts. This view coincides with the histogenetic researches of Balfour[12 13] and Milnes Marshall." [14]

According to the first view, every nerve-trunk, when divided, undergoes certain characteristic degenerative changes, consisting of segmentation of the myelin and axis-cylinder, a proliferation by means of a mitotic cell division of the interannular nuclei and the protoplasm surrounding these nuclei. Concurrent with the segmentation of myelin and axis-cylinder there goes on an absorption of the resulting fragments. As a result of these changes there remain only the collapsed sheaths of Schwann, containing a narrow band of nucleated protoplasm. These degenerative changes occur in the entire portion of every divided nerve-trunk, no matter how quickly or how accurately the divided ends are coapted.

The peripheral end of the central portion of the divided nerve undergoes the same degenerative changes to the extent of about ½ to 1½ cm., depending somewhat on the nature of the injury. Following immediately on these degenerative changes, regenerative changes begin to make their appearance. This regeneration of the divided nerve takes place from the central undegenerated end as outgrowths from the undegenerated young axis-cylinders. If the mechanical conditions be favorable, the peripheral degenerated portion of the nerve is subject to regeneration. In case the injured nerve is sutured soon after severance of its continuity, or when, from the nature and position of the injury, the ends of the divided nerve do not contract much, embryonic connective tissue developing between the severed ends forms only a relatively unimportant layer through which the down-growing axis-cylinder may penetrate and finally reach the degenerated distal nerve-trunk. If the embryonic connective tissue be for any reason denser, the small bundles

of down-growing axis-cylinders meet with resistance in their attempt to reach the peripheral end of the divided nerve, become tortuous and deflected upon themselves, and the so-called bulb-tissue is formed.

Transplantation of a peripheral nerve between the ends of a divided nerve is a surgical attempt to prevent the formation of dense connective tissue and to provide a path of least resistance for the down-growing young axis-cylinders. The microscopical researches of Huber[15] tend to prove that a transplanted nerve is superior to catgut strands (Assaky[16]) or tubular sutures (Vanlair[17]) as a path for the down-growth of the axis-cylinders.

Necessarily these conclusions were arrived at from entirely experimental studies. Whether they will apply as well to the human subject can be determined only by a careful study of a considerable number of cases of nerve transplantation. From the favorable result obtained in the present case, and from a consideration of nineteen additional cases of nerve transplantation I have been able to collect, I believe that the operation has a distinct place in surgery.

A consideration of the changes in sensation and motion following the operation in the case just reported reveals many interesting phenomena. The first return of sensation in a previously anæsthetic area was noted within twenty-four hours after the operation, sensation being tested on the thumb by a pin. Tests made in this way are not open to the objection of those made with a blunt object, for by the latter method, as pointed out by Létiévant,[18] impact against the anæsthetic area may be carried to sound papillæ and carried upward by other nerves. This rapid return of sensation is not an uncommon occurrence, as recorded cases of nerve section and suture reveal. As it is generally conceded that the transplanted nerve segment degenerates, as does any other resected nerve, only more rapidly, it is contrary to all biologic law to suppose that sensation is so quickly conveyed over this bridge of foreign tissue. Yet this rapid return of sensation is advanced as an argument by those who claim that the fibres originate in the peripheral end from the sheath of Schwann. Thus Kennedy,[1] in speaking of the rapid return of sensation after operation, says:

"Cases in which sensation remains totally lost before operation and long after date of section of the nerve, but returns in a few days after the operation, cannot be explained on the theories mentioned (slow process of regeneration from the central end), and must indicate a reunion of the nerve and re-establishment of conductivity."

That there is fallacy in this reasoning is seen by such cases as the one reported by Vucetic,[19] in which there was great improvement in sensation and some in motility six hours after 15½ cm. of the right median nerve were excised and the resected ends not brought together. There certainly was no question of the re-establishment of conductivity

in this case; yet the sensation returned in the previously anæsthetic area. These facts would lead us to suppose that Vanlair[17] and others are right when they contend that rapid return of sensation after nerve section or a secondary operation must be due to anastomosing nerve-fibres or to supplementary supply. It is probably not true that a single area of skin is supplied by one nerve alone. A number of facts would tend to show that there is a rich microscopical collateral nerve-supply which, under normal conditions, is not called into action, but under other conditions may alone be the carriers of sensation. The case of Richet,[20] where there was entire division of the median and no loss of sensation in its territory, and that of Létiévant,[18] who found, a month after the injury, no loss of sensation following division of the median and ulnar, show that the accepted distinction of motor and sensory nerves is not always constant. Weir Mitchell[21] has recorded a number of similar cases, among them the remarkable case of Nott, "who removed a large cyst from the flexor surface of the forearm, and with this tumor five inches of the median nerve, and yet the function usually assigned to this nerve was not interfered with in the slightest degree."

If, then, there be nerve-tracts to a given area other than those whose conductivity has been destroyed, why do not these tracts functionate at the time of the nerve section? It would seem as if irritation of the nerve at the point of lesion, and its consequent inhibitory action through the agency of the spinal cord on other peripheral nerve-fibres, must play an important causative part in the production of the phenomena. Experimentally, this inhibitory action of an irritated nerve has been shown to exist. Hence it seems perfectly plausible that the same effect may be produced by an injury to a peripheral nerve. This irritative inhibitory influence will continue in most cases, and distinct anæsthetic areas will be the result. The irritation being relieved by operation and the inhibitory influence removed, sensation conveyed through other tracts is the immediate result. In some such way as this must the early return of sensation be explained.

A study of Figs. 3 to 8 shows that from October 17th to November 8th, a period of twenty-two days, the return of sensation was relatively more rapid on the dorsal surface of the hand and in the neighborhood of parts supplied by the radial. On the palmar surface it will be seen that the return is much greater on the outer side of the hand in close proximity to fibres of the radial than on the ulnar side. This period—twenty-two days—is evidently too short for return of sensation from the down-growth of axis-cylinders, and must be explained by transmission of sensation through other tracts, the inhibitory influences of the irritated central nerve-ends having been removed by the operation. In the next period, however, from November 8th to November 29th, twenty-one days, we see a relatively greater progress

in sensation on the ulnar side of the palmar surface of the hand. This may be due partially to the down-growth of axis-cylinders and partially to collateral nerve-supply. How much is to be ascribed to each it is impossible to say. The increase of sensation on the dorsal surface of the hand during this period is very slight, and the axis-cylinders evidently have not reached the anæsthetic areas in their downward growth.

In the third period—November 29th to December 31st, thirty-two days—the progress of sensation on both palmar and dorsal surfaces has been relatively much slower than during the first two periods. This corresponds with the facts noted in other cases I have critically reviewed.

It is very graphically shown by the charts that the improvement in sensation is toward the finger-tips, and it may be noted in passing that this is an argument in favor of regeneration from the central and not the peripheral end. If regeneration of the axis-cylinders arises from the sheath of Schwann, and maturation of the fibres is completed when the central and peripheral ends are united, the new fibre should functionate throughout its entire length at the same time, which is not the case.

Particular attention is called to variations in sensation occurring during very short periods of time. For example, it is noted on November 8th that a previously sensory area in the palm was on that date anæsthetic. A number of other instances can be found by carefully comparing the notes with the charts. The explanation of this "vacillating sensation" may lie in the changes in nutrition occurring in the cells surrounding the nerve-endings. This has been shown repeatedly in physiological experiments where changes of nutrition in a muscle will produce the greatest variabilities in sensation. For the same reasons variations in muscular power may be expected, and while none were noted in the present case, Dr. Ferguson informs me that variations in the motor power were very marked in his case of nerve transplantation.

While the nutrition of the hand improved rapidly after the operation, it was by no means normal at the time the patient left this country to resume his work in Canada, and the freezing of the hand and subsequent amputation of two fingers were the result. This was unfortunate, as undoubteldy he eventually would have recovered sensation in the entire hand.

The improvement in motility is also very interesting. The saw cut, it will be remembered, was just above the wrist and below the muscular branches of the median, given off to all the long flexors of the forearm, except the flexor carpi ulnaris and half the flexor profundus digitorum, which are supplied by the ulnar. Hence the motor supply to these muscles was not interfered with, although the movements were not free,

owing to the injury to the flexor tendons. The actions of the extensor muscles were not interfered with. There was complete paralysis of the small muscles of the hand supplied by the median and ulnar nerves.

The first improvement in motion is noted as occurring between two and three weeks after the operation. At this time the patient was able to hold a tin wash-basin between the thumb and forefinger, although before operation it had been impossible to hold a lead-pencil between the same fingers. Opposition and adduction of the thumb is also noted as improving. This improvement in motion is more than can be explained by the freeing of the flexor tendons from adhesions at the time of the operation All the small muscles of the hand being paralyzed by the section of both ulnar and median nerves, the improvement in motion cannot be explained by vicarious movements of neighboring muscles which have not lost their nerve-supply (Létiévant[22]). The two possible exceptions to this might be the long flexor of the thumb and the extensor metacarpi pollicis. The latter muscle is innervated by the posterior interosseous, and therefore was uninjured in the present case. Its action is to carry the thumb outward and backward from the palm of the hand, and hence it is often called the abductor longus pollicis. But abduction of the thumb is not noted as improving at this time, although opposition and adduction are. Both these motions may be explained in part by the increased action of the long flexor of the thumb after the operation.

Unfortunately, careful electrical examination was not possible after the operation. When the first improvement in motion was noted the muscles failed to respond to faradic stimulation, the action of the galvanic current not being tried.

Two months after the operation the muscular power of the hand had markedly increased. The ends of the fingers could be flexed into the palm and an object be grasped through flexion of the knuckles. This motion is through the action of the interossei combined with the long flexors. Opposition of the thumb had increased markedly as had adduction, although the latter movement was still impossible without flexion of the thumb, and may in a large part have been due to the action of the long flexor. The atrophy of the small muscles is noted as diminishing, though still quite marked. The improvement of motor power in the whole hand was most marked, and in another month the patient declared it as well as ever, and went back to work. While this may have been true from the patient's stand-point, from a scientific point of view it was far from true; for over one year afterward the finer movements of the small muscles of the hand, such as abduction and adduction of the fingers (interossei) and adduction and abduction of the thumb without its flexion, are still impossible. There is also wasting of the smaller muscles of the hand. This shows that the action of the

hand, as a whole, cannot be taken as a test of return of motility to individual formerly paralyzed muscles. As suggested by Kennedy, after five months' separation from their trophic centres the muscles may never be able to resume their normal functions, although the regeneration of the nerves down to the muscles may be complete. It must also be borne in mind that owing to the frostbite the patient was unable to use his hand for over eight months, and this probably had a marked effect in preventing the already atrophied muscles resuming their normal size and function.

After a careful search I have been able to add seven cases of nerve transplantation to the thirteen collected by Huber.[15] Two of them (18 and 19) are unpublished cases, the notes of which were kindly furnished me by Drs. White and Ferguson. Huber collected in all fourteen cases; but his fourth case by Tillmanns must be rejected, as it was one of flap suture instead of transplantation. How the error arose seems to be uncertain, but the quotation from Bowlby[23] possibly explains where it originated. Neither in Tillmanns's communication to the German Surgical Society, April 11, 1885 (*Berliner klin. Wochenschrift*, 1885, p. 375), nor in his article on the subject of loss of nerve-substance in Langenbeck's *Archiv*, 1885, vol. xxxii., where it was reported in detail, is anything said about nerve transplantation in this case.

As showing the ease with which errors may arise in collecting cases from the literature, it is only necessary to mention the one discovered in going through the eleven cases of nerve transplantation mentioned by Spijarny.[24] This author reports among his eleven cases three by Albert. This must be reduced to two, as it is evident that the first and second refer to the same operation. Spijarny's quotation is evidently taken from Wolberg[25] in the first case, the latter publishing in full and giving the proper date, 1876. Albert's[26] one publication of the same operation furnishes the second one as given by Spijarny. That this is so is also sufficiently evident from the fact that Albert, communicating with Wolberg, would not have omitted it in his statistics.

Probably there are other cases of nerve transplantation buried in society reports, but as far as lay in my power I have endeavored to make the list complete. By private communications I was enabled to obtain later reports in Lange's and Bradley's cases. The number of cases is few and the value of a summary correspondingly small, but I believe it will be useful even if it be only to call attention to the lack of details characteristic of most of the cases.

TABULATED LIST OF 20 CASES OF PERIPHERAL NERVE TRANSPLANTATION.

No.	Operator and where reported.	Nerve operated upon and nature of injury.	Primary or secondary operation.	Distance separating central and peripheral segments.	Method used to overcome the nerve defect.	Results.
1	Albert Einige Operationen an Nerven. Wiener med. Presse, No. 39 und 41, 1885, Jahrgang 26.	Man, aged 40. Right median in forearm; result of removing sarcoma of the nerve. Had previously had fairly good results from paraneurotic catgut suture, but tumor reappeared, and this was second operation.	Primary.	3 ctm.	Implantation of a nerve obtained from an amputat'd foot; catgut suture above and below.	Patient observed ten days; wound healed; no further observation; no results as regards sensibility and motility.
2	Albert. Ibid.	Farmer, aged 61. Had enlargements on several nerves, which were supposed to be of sarcomatous nature. June 11, 1881, one of these was removed from right ulnar near elbow.	ry.	10 ctm.	Implanted 10 ctm. from post. tibial taken from an amputated leg. Sutured with catgut.	June 17, 1881. The implanted segment came away in a necrotic state.
3	Kaufmann. Eine Nerven-Transplantation. Corresp. Blatt f. Schweizer Aerzte, March 15, 1882. Revue des Sciences Médicales 1884, T. 24, p. 305.	Musculo-spiral nerve was sectioned during operation on necrosed humerus; the nerve was later exposed, the ends vivified. Owing to anchylosis the ends could not be brought together. Typical musculo-spiral paralysis.	Secondary.	4 ctm.	Dog's sciatic implanted; silk suture used.	Operation was followed by fever; the result could not be determined at the time the report was given; no further observation made.
4	F. Lange. Verhandl. d. deutsch Gesellsch. f. Chir., Berl., 1882, xi p. 55.	Musculo-spiral. Four inches of nerve removed in operation for neuroma, from where it leaves axilla to where it turns behind humerus.	Primary.	4 inches.	Four inches of dog's sciatic inserted between resected ends of nerve.	Wound healed; results negative as to function. In private communication, dated April 14, 1898, Dr. Lange writes: "Paralysis remained permanent; about one year after the operation I saw the patient again with an eruption of multiple neuromata, and I have no doubt that he eventually must have succumbed to the disease, which showed an unmistakably malignant character."
5	Gersung. Rep. by Damar Harrison. Trans. Clin. Soc. London, 1892, vol. xxv.	Median. Removal of neuroma just above annular ligament.	Primary.	6 ctm.	Six ctm. of the sciatic removed from a rabbit engrafted.	Sensation began to return in two months; return of muscular movement not recorded; no further tendency to neuromatous degeneration; had before repeatedly suffered from this.
6	Vogt. Mittheilungen aus der Chir. klin. z. Griefswald, Urban u. Schwarzenbnrg, Wien, Liepzig, p. 122.	Musculo-spiral in upper arm. Gunshot wound.	Secondary, 1¼ years after injury.	8–10 ctm.	The defect was bridged by 12 ctm. taken from the two sciatics of a dog.	Suppuration followed; two months after the operation the nerve did not conduct impulses.

7	Mr. Mayo Robson, Clinical Society of London, Friday, June 5, 1889. Brit. Med. Journ., 1889, vol. i. p. 244.	Girl, aged 14. Median, right side just above annular ligament. Patient had a tumor just above annular ligament; this was easily separated from the surrounding cellular tissue, but was inseparably blended with a cord to which it was attached. The cord was severed and tumor removed. After recovering from anæsthetic, patient had complete anæsthesia of the portion of hand supplied by median. Microscopical examination proved the cord to be composed of nerve fibres.	Secondary, 48 hours after operation.	2½ inches.	Implantation of a post. tibial nerve which had been removed from a leg amputated by Mr. Ward. The nerve was carried from one amphitheatre to another in warm carbolic acid solution; a segment of suitable length was taken and placed between the ends of the resected median, and sutured above and below by a direct catgut suture.	Thirty-six hours after the implantation, sensation had returned to the extent that touch with a pencil could be localized. Five weeks later the sensation was so perfect that the slightest touch could be localized. At this time there was manifest diminution of the abductor and flexor brevis pollicis; however, they were not completely paralyzed.
8	Dr. H. Landerer. Einheilung eines Kaninchen Nerven in einen Defect des Nerven Radialis. Deutsche Zeitschrift für Chirurgie, 1888, vol. xxviii. p. 604.	Woman, aged 18. Musculo-spiral nerve. Patient had acute phlegmon of upper arm 1½ years before this operation; ¾ of a year after the beginning of the disease, several sequestra were taken out, the fistula united by incision, and no doubt a segment of the radial removed. Total musculo-spiral paralysis.	Secondary, more than ½ year after removal of sequestra nerve was exposed.	3½ ctm.	Implantation of rabbit's sciatic; piece 4¼ ctm. in length placed between the ends of radial, not sutured to the nerve, but held in place with several buried catgut sutures.	Wound healed by first intention; three weeks after implantation electrical stimulation above and below gave contraction of muscles; methodical electrical treatment was now begun; ten weeks after operation the patient was shown to the Leipzig Medical Association, and at that time could elevate the hand to the horizontal position even against some pressure. Landerer adds: "Diese Thatsachen scheinen mir eine andere Deutung kaum zuzulassen, als dass in der That das fremde Schaltstück wenigstens f. einige Zeit erhalten blieb und nervöse Erregungen zu leiten vermochte. Später wird es natürlich von eigenen Nerven-Fasern durchbrocken."
9	Mr. Ward. Remarks on Nerve Grafting. By Edw. Atkinson. Brit. Medical Journal, Sept. 13, 1890, vol. ii. p. 624.	Laborer, aged 42. Median nerve. July, 1888, patient was operated upon for painful tumor just above internal condyle of right arm. On cutting down, tumor was found to be surrounded by median, out of which it could easily be shelled. Nov. 1888, patient returned with similar growth in the same location. Jan. 1, 1889, this with 1¾ in. of the nerve was removed. Paresis of hand and forearm, intention tremor, darting pain before operation.	Primary.	1¾ inches.	2¼ inches of a median nerve taken from an amputated arm were implanted and sutured with fine catgut.	Jan. 12. Numbness and tingling over the whole limb. Jan. 20. Wound healed. Feb. 2. Slight thickening along the course of the nerve; no pains; stated that fingers are cold, but feel warm; thumb and index finger very weak; hand looks wasted, especially the thenar muscles. July 26, 1890. Slight degree of wasting of the forearm; thenar eminence almost entirely absent; sensation normal to wrist; below, dull over the median area; movement of index and middle fingers normal in range, though weak; movements of the thumb limited to flexion, extension, and abduction; adduction and opposition entirely wanting.

No.	Operator and where reported.	Nerve operated upon and nature of injury.	Primary or secondary operation.	Distance separating central and peripheral segments.	Method used to overcome the nerve defect.	Results.
10	Mr. Mayo Robson. Remarks on Nerve Grafting. By Edw. Atkinson. British Medical Journal, Sept. 13, 1890, vol. ii. p. 624. Later report Brit. Med. Journ., Oct. 31, 1896.	Ulnar and median. Silk dresser, aged 29. 7 months before seen, patient fell on a scythe and received a deep cut on inner and lower part of right arm. At the time of admittance there was loss of sensation and motion in parts below injury supplied by median and ulnar.	Secondary about 7 months after injury, Jan. 30, 1890.	Ends of median 2 inches apart after vivifying stump.	Ulnar nerve was sutured; internal cutaneous (?) was also found divid'd. and was sutured to the ulnar; 2 in. of the spinal cord of a rabbit implanted between the ends of median, and held in place by sutures.	Feb. 7. Patient can feel the scratch of a pin on flexor aspect of first phalanx of thumb, also at the root of index finger; can also tell when a hair located on the first phalanges of little and ring fingers is pulled, but cannot feel the scratch of a pin in these regions. March 4. Sensation in the palmar surface of hand supplied by median, and creeping along the fingers. No marked improvement in ulnar region. Apr. 1. Flexors of forearm all respond to kathodic closing current; muscles of the thenar eminence do not react on faradization. April 30. Sensation returning on the back of ring finger; voluntary flexion of wrist and fingers beginning to be possible. June 13. Nutrition of hand much improved; patient can pick up small objects; no sensation in area supplied by ulnar. Later report, March, 1891, resumed work. Exam. Feb. 1896. Left arm only $\frac{1}{2}$ in. larger than right; muscles completely restored, movements almost as perfect in right as in left arm; only weak muscle was adductor of thumb which had no perceptible power; sensation completely restored.
11	Edward Atkinson. Ibid.	Sciatic nerve. During operation for gluteal abscess 1 inch of the sciatic was removed.	Primary.	1 inch.	Immediately the exsected portion of the sciatic was again implanted and sutured in place with catgut sutures.	Complete anæsthesia of the limb the day after the operation; five days later sensation began to return to the toes; sixteen days after the operation the child could localize the touch of a pin-point anywhere on the limb.
12	Edward Atkinson. Loc. cit.	Miner, aged 22. Ulnar nerve. Laceration wound of right forearm. Ulnar artery and nerve, flex. sub. dig., flex. carp. ul., and palmaris long. were torn. Ends of ulnar free in the wound. Ulnar paralysis.	Primary.	2 inches.	$2\frac{1}{2}$ in. taken from the two sciatics of a rabbit implant'd and sutured with a single suture above and below to the ulnar; muscles sutured and wound closed.	Five days after the operation, on removing the dressing, the skin flap was under great strain; a stitch was removed, allowing the escape of a large quantity of a brownish, blood-stained pus; the wound was irrigated, and salicylic wool applied Eighteen days. Sensation beginning to return in ring and little fingers. Twenty-five days. Wound closing; sensation increasing; some return of muscular power is noticed. July 24, three months after operation. Sensation complete in all fingers, except the last two phalanges of little finger; all fingers except little finger can be flexed on the palm.

13	Damar Harrison. A Case of Nerve Grafting. Transactions of Clinical Society of London, 1892, vol. xxv.	Boy, aged 13. Median. Eleven weeks before admission a large glass plate fell on his wrist and divided all the tendons except flex. carp. ul., and the median nerve. At that time the structures were sutured; suppuration and sloughing ensuing. At the time of admission the hand was cold, skin glossy, and muscles atrophied. Flexor tendons were matted together. There was loss of sensation and motion in the median area.	Secondary, 11 weeks.	2 inches.	2 in. were taken from the sciatic of a kitten and sutured between the ends of median with catgut; fingers were straightened and flexor tendons separated.	Wound healed by first intention; forty-eight hours after operation prick of pin could be felt in palm of hand and over the first phalanx of thumb. Three days, pricking felt over the thumb and first phalanx of index and middle fingers; nutrition improved at the end of 2½ to 3 months. Eight months after operation he can abduct the thumb and oppose it to index finger; flexion of fingers on palm is not perfect.
14	Mitchell Banks. A brief report of the case is given by Damar Harrison, loc. cit.	Ulnar nerve. Excision of neuromatous tumor.	Primary.	4 inches.	4 in. grafted from the sciatic of a dog.	Sensation is said to have returned at the end of thirty-six hours.
15	Moullin. Lancet, June 24, 1893.	Male, aged 28. Ununited fracture left humerus; good union of bone after operation, but motor and sensory paralysis. Section of musculo-spiral nerve removed.	Secondary.	2 inches.	2 in. of dog's sciatic implanted between resected ends of musculo-spiral, sutured with catgut.	Healed by first intention; sensation began to return in 3 days, and 5 days later was nearly normal in fingers; 15 days later only a very small region at metacarpo-phalangeal joint of index finger remained affected, and this soon disappeared; muscles reacted to strong faradic currents and seemed firmer, but voluntary power did not return, and wasting became extreme.
16	Heath. Lancet, 1893, vol. i. p. 1194.	Servant, aged 21. Right ulnar nerve. Gap of 2 inches left from excision of tumor; operation January 6, 1893; motor paralysis; anæsthesia of little and inner side of ring finger and back of hand to 3d metacarpal.	Secondary, 4 days after injury.	2½ inches.	Ends of excised nerves freshened and piece of posterior tibial of an amputated limb transplanted; five silk sutures used	Decrease of anæsthesia of back of hand on 4th day. It had extended only to 3d metacarpal and now extended to 4th; no further return of sensation or power to muscles innervated by ulnar. Anæsthesia on palmar surface still existed to 4th metacarpal Operation Jan. 6, 1893; March 27 no return of function of ulnar; little finger blue and glossy, and small ulcer on dorsum.
17	Bradley. Medical News, Feb. 8, 1896; Lancet, 1896, vol. i. p. 1592.	Soldier. Musculo-spiral from fracture of right humerus. Paralysis of extensors; operat. June 22, 1895; nerve continuous, but involved at seat of injury in hard nodular tumor 2 ctm. long, 1 thick, nerve on each side for some distance firmly adherent to callus and dissected away with difficulty; tumor removed.	Secondary, 2 months after injury.	5 ctm.	5 ctm. of prepared sciatic of dog inserted in gap left by removal of tumor; catgut sutures.	About one month after operation case passed from observation; thought there was some return in sensibility when last seen; no improvement 5 months after operation. Patient now in Soldiers' Home, Washington, D.C. The attending surgeon writes, under date of April 2, 1898: "Respectfully returned to the Gov. of the Home, with the report that —— has paralysis of the right hand and fingers. The nerve-grafting experiment was entirely unsuccessful."
18	J. William White. Unpublished data received from Dr. White in communication dated April 8, 1898. He was consulting surgeon, and did not have written notes of case.	Female. Musculo-spiral nerve had been divided some time previously in removal of small tumor; operation showed ends considerably separated; nerve flap operation performed and ends united; no improvement followed. After another considerable delay second operat'n, uniting portions of nerve converted into a thin band of fibrous tissue; sections made and healthy nerve exposed above and below.	Secondary, considerable time after injury.	.....	Sciatic nerve of dog inserted in gap between resected ends of musculo-spiral; latter and dog nerve were thr'gh a small decalcified chicken bone intended to give stability to both.	Immediate result encouraging; no permanent improvement resulted.

No.	Operator and where reported.	Nerve operated upon and nature of injury.	Primary or secondary operation.	Distance separating central and peripheral segments.	Method used to overcome the nerve defect.	Results.
19	A. H. Ferguson. Unpublished.	Female, aged 18. During removal of neuroma of left median one inch of latter nerve removed just above wrist; gap bridged with catgut; in six weeks there was anæsthesia over area supplied by median. Grasp of hand imperfect. Three months after operation, Aug. 12, 1893, there was noticeable atrophy of the ball of the thumb; grasp about same; return of sensation not marked.	Secondary, Aug. 12, 1893, 3 months after catgut strands operation.	1½ inches.	1½ in. of sciatic nerve of young dog inserted between separated fragments of median; silk sutures used.	Improvement in sensation; third day after operation could locate fingers by pin pricks except third finger. On eighth day thumb and adjacent three fingers sensitive; ring finger hyperæsthetic; sensation around the nails was present. Six weeks after the operation complained of painful, creeping sensation down fingers; sensation more normal; no return of motion. Was under direct observation for one year; improvement in motion began three months after operation; during year muscular power varied markedly during short intervals. Two years after operation (1895), "hand still lame, but very useful; sensation entirely returned for objects larger than fine thread or horse-hair."
20	Peterson.	Male, aged 24. May 17, 1896, sustained circular saw-cut of right wrist; median and ulnar nerves severed, also a number of flexor tendons; these were sutured; complete loss of sensation over areas supplied by median and ulnar nerves; blebs and ulcers appeared on fingers; fingers became flexed from contraction of tendons; marked atrophy of small muscles of hand and the thenar and hypothenar eminences flattened; hand could be partially closed; adduction and apposition of thumb impossible. Electrical examination showed reaction of degeneration in small muscles of hand. Operation Oct. 24, 1896, over five months after injury.	Secondary, 5 months after injury.	3⅛ ctm.	4 ctm. of sciatic nerves of a dog inserted between the incised ends of both median and ulnar nerves; fragments sutured with kangaroo tendon above and below.	Return of sensation to thumb 24 hours after operation. 7th day after operation. Superficial suppuration of median incision; sensory area on thumb increasing; pricking sensation of hand. 8th day, rapid increase of sensation over dorsal surface of hand. From 8th to 21st day, increasing sensory areas on dorsal and palmar surface of hand; trophic ulcers have disappeared; hand natural color. On 21st day decided improvement in muscular power; can touch dorsal surface of second knuckle of first finger with end of thumb, etc. Two months after operation tips of fingers can be closed into palms; grasp of hand good; less atrophy of small muscles of hand. 3 months. Went to work; said his hand was as good as ever; could chop wood, etc.; sensation complete except tips of 2d, 3d, and 4th fingers. 4 months. Froze his hand, unable to use it for eight months; discharge from 1st and 3d fingers necessitating amputation. 1½ years after operation. Hand used every day in his work; sensation very nearly normal; finer movement of hand still impossible; some atrophy of muscles.

SUMMARY OF TWENTY CASES OF NERVE TRANSPLANTATION.

Of the 20 cases, 9 were males and 5 females. The sex was unrecorded in 6. The age was stated in 12 cases, the average being twenty-seven and one-half years. The median nerve alone was operated upon in 7 cases, the ulnar alone in 3 cases, and the median and ulnar together in 2 cases. The musculo-spiral was operated upon in 7 cases, and the sciatic in 1 case.

The injuries to the nerves necessitating transplantation in 10 cases were due to removal of tumors involving the nerves. Incised wounds were responsible for 4 cases. Injury followed operation for necrosis twice, while gunshot-wound, operation for gluteal abscess, ununited fracture, and simple fracture were responsible for one case each.

There were 8 primary and 12 secondary operations. The time elapsing from date of injury to time of operation varied from forty-eight hours to one and one-quarter years. Eight out of the 12 cases of secondary operation, or two-thirds, showed improvement in sensation or motion, while only 4 out of the 8 cases of primary operation, or one-half, showed signs of improvement. However, 2 of the 8 cases (11 and 12) were observed only ten and six days respectively.

The distance separating the central and peripheral fragments varied from 3 to 10 cm. As far as can be judged, the distance did not seem to effect ultimate results. In 9 cases the transplanted segments were from sciatics of dogs, in 5 from recently amputated limbs, in 3 from the sciatics of rabbits, and 1 each from the spinal cord of a rabbit and the sciatic of a kitten. In one case the excised nerve was itself implanted.

In 9 cases catgut was used to unite transplanted segments to central and peripheral ends of excised nerves, in 3 silk, and once kangaroo tendon was employed. In 7 cases no mention is made of the suture material.

Strictly speaking, no case can be said to have recovered entirely, if by that be meant a complete restoration of sensation, together with a return of the muscles to their former size and power. The nearest approach to this condition occurs in the case longest under observation (10), where at the end of six years sensation had entirely returned, and the only remaining weak muscle was the abductor of the thumb. In 3 cases (10, 19, and 20) there was practical recovery of sensation and motion, so that the hand was entirely useful. In two of these (10 and 20) both median and ulnar nerves were operated upon.

There was complete return of sensation recorded in 4 cases (7, 10, 11, and 19). In 3 cases (12, 15, and 20) there was nearly complete return of sensation. Improvement in sensation was recorded in 4 cases

(5, 13, 14, and 16), while improvement in muscular power is noted also in 4 cases (7, 8, 12, and 13).

There was improvement in either muscular power or sensation in 12 cases (5, 7, 8, 10, 11, 12, 13, 14, 15, 16, 19, and 20), while in 6 cases (1, 4, 6, 9, 17, and 18) there was no improvement in either sensation or motion.

The shortest time any case was under observation was six days; the longest six years. Of the 5 cases under observation one year or more (4, 10, 17, 19, and 20), 3 (10, 19, and 20) made nearly complete recoveries in both sensation and motion.

The average time in which sensation first appeared after the operation was about 10 days, while the average time for the first appearance of motion was about 2½ months.

GENERAL CONCLUSIONS.

1. Transplantation of a peripheral nerve segment to bridge over a gap between the two ends of a resected nerve is a legitimate surgical procedure.

2. Under favorable conditions at least partial and at times complete restoration of sensation and motion may be expected to follow the operation.

3. Regeneration of the degenerated peripheral end is due to down-growths from the axis-cylinders of the central end.

4. From the slowness of this process the longer the time after operation the more favorable will be the results.

5. Sensation may return very early after operation, and, as a rule, precedes return of motion.

6. This rapid return of sensation is not due to down-growth of axis-cylinders or to conductivity of the transplanted fragment, but must be explained by collateral nerve-supply.

7. In many cases very early return of motion after transplantation may be due to vicarious movements of other muscles than those formerly paralyzed and not to a regeneration of the latter's nerve-supply.

BIBLIOGRAPHY.

1. Kennedy, R. The Regeneration of Nerves. Philosophical Transactions of the Royal Society of London, 1897, vol. clxxxviii. pp. 257–299.

2. Ranvier. De la régénération des nerfs sectionnés. Compt. Rend. de l'Acad., 1873, p. 491.

3. ———. Leçons sur l'histologie du système nerveux. Paris, 1878.

4. Kölliker, Albert. Entwicklungsgeschichte des Menschen und der höheren Thiere. Leipzig, 1879, second edition, p. 600.

5. His. Ueber die Anfänge des peripherischen Nervensystems. Archiv f. Anat. u. Physiol. (Anat. Abth.), 1879, p. 455.

6. ———. Die Entwickelung der ersten Nervenbahnen beim menschlichen Embryo. Uebersichtliche Darstellung. Archiv für Anat. und Physiol. (Anat. Abth.), 1887, p. 368.

7. ———. Die Neuroblasten und deren Entstehung im embryonalen Mark. Archiv für Anat. und Physiol. (Anat. Abth.), 1889, p. 249.

8. Howell and Huber. A Physiological, Histological, and Clinical Study of the Degeneration and Regeneration in Peripheral Nerve-Fibres after Severance of their Connections with the Nerve-Centres. Journal of Physiology, 1892, vol. xiii. p. 355. 1893, vol. xiv. p. 1.

9. Stroebe. Experimentelle Untersuchungen über Degeneration und Regeneration peripherer Nerven nach Verletzungen. Ziegler's Beiträge, 1893, vol. xiii. p. 160.

10. v. Notthafft. Neue Untersuchungen über den Verlauf der Degenerations und Regenerations processe am verletzten peripheren Nerven. Zeitschr. für wissensch. Zoöl., 1893, vol. lv. p. 134.

11. v. Büngner. Ueber die Degenerations und Regenerations vorgänge am Nerven nach Verletzungen. Ziegler's Beiträge zur path. Anat., 1891, vol. x. p. 321.

12. Balfour, F. M. The Development of Elasmobranch Fishes. Journal of Anat. and Physiol., 1877, vol. xi. p. 406. Development of the Spinal Nerves, p. 422.

13. ———. A Treatise on Comparative Embryology. London, 1881, vol. ii. p. 369.

14. Marshall, Milnes. On the Early Stages of Development of the Nerves in Birds. Journ. of Anat. and Physiol., 1877, vol. xi. p. 491.

15. Huber, G. Carl. A Study of the Operative Treatment in Loss of Nerve Substance in Peripheral Nerves. Journal of Morphology, 1895, vol. xi. No. 3.

16. Assaky. De la suture des nerfs à distance. Arch. gén. de Méd., 1886, p. 529.

17. Vanlair, C. De la régénération des nerfs périphérique par le procédé de la suture tubulaire. Archives de Biologie, 1882, vol. iii. p. 379.

18. Létiévant. Traité des sections nerveuses. Paris, 1873.

19. Vucetic, N. Allg. Weiner med. Ztg., 1892, p. 142.

20. Richet. Section du nerf médian Conservation de la sensibilité tégumentaire. Sensibilité récurrente exceptionelle. Gaz. des Hôp., 1867, pp. 519, 581, 555.

21. Mitchell, Weir. Injuries of Nerves, 1872.

22. Létiévant. Phénomènes physiologiques et pathologiques consécutifs à la section des nerfs principaux du bras. Lyon Méd., 1869, Nos. 21 and 22. Virchow-Hirsch Jahresbericht, 1869, vol. ii. p. 291 and 321.

23. Bowlby. Injuries and Diseases of Nerves, 1889, p. 208.

24. Spijarny. De la suture nerveuse. Chirurgie Liétapice, 1894, vol. iv. p. 143. Rev. de Chir., 1895, pp. 857–9.

25. Wolberg. Kritische u. experimentelle Untersuchungen u. d. Nervennaht u. Nervenregeneration. Deutsche Zeitsch. für Chirurgie, 1882 and 1883, vols. xviii. and xix.

26. Albert. Ber. d. Naturw. med. Ver. in Innsbruck, 1878, vol. ix. p. 97.

Supplementary Bibliography.

1. Ehrmann. Contribution à l'étude de la suture des nerfs à distance. Thèse de Paris, 1896, No. 22. Analysis in Gaz. Hebd., February 7, 1897, No. 11.

2. Finotti. Beiträge zur Chirurgie und path. Anatomie periph. Nerven. Virchow's Arch., 1896, cxliii. p. 133–169.

3. Galleotti and Levi. Ueber die Neubildung der Nervosen Elemente in dem wiederzeugten Muskelgewebe. Ziegler's Beiträge, 1895, Bd. xvii. p. 369.

4. Gluck. Demonstration eines Präparates von Nervenregeneration nach Resection und Implantation. Gesellschaft der Charit Aerzte, 1895, iii. 7. Berliner klinische Wochenschrift, 1895, No. 28.

5. Kölliker. Jahresbericht u. d. Fortschr. auf dem Gebiete der Chirurgie, 1896, p. 282.

6. Laborde. Conditions de la Régénération organique et functionelle à la suite de la suture nerveuse. Bull. de l'Acad. de Méd., 1893, 3 S , xxix. p. 367.

7. Ziegler, P. Untersuchungen ueber die Regeneration des Achsencylinders Durchtrennter peripherer Nerven. Archiv f. klinische Chirurgie, 1896, vol. li. p. 796–826.

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ABSCESSES OF THE CEREBELLUM FROM INFECTION THROUGH THE LABYRINTH:

THEIR DIAGNOSIS AND TREATMENT, INCLUDING A STUDY OF FOUR CASES.

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CLINICAL PROFESSOR OF OTOLOGY IN HARVARD UNIVERSITY.

Case I. *Chronic suppuration of the tympanum; caries into labyrinth; abscess of cerebellum from infection through the meatus internus.*—R. C. S., aged twenty-six years, a robust negro, with chronic suppuration of the right tympanum for twenty years, following measles, was first seen November 29, 1895, in an unconscious condition. Four weeks before he suddenly had vertigo, followed by vomiting and pain in the ear and head, but not enough to keep him in the house. Ten days before a small polypus was removed from the ear; ever since there had been much dizziness, vomiting, and severe pain at the vertex of the head. For the last twenty-four hours he had been delirious. On examination he was totally unconscious, but very restless; there was divergent strabismus; the fundus of the right eye was normal, that of the left eye could not be seen (Dr. A. G. Morse). The meatus was filled with a very profuse, thin, bloody discharge; the right drum membrane had been entirely destroyed, and desquamative material was protruding from the aditus; there was apparently no tenderness of the mastoid. Pulse 72 and strong. Temperature 99° F. by rectum.

After consultation with Dr. James J. Putnam, exploration was decided upon as a last resort, and a tympano-mastoid exenteration was done. The bone was sclerosed throughout, the antrum, aditus, and epitympanum were filled with desquamative material and granulations, and much caries could be felt on the inner wall of the tympanum. During the chiselling of the mastoid, when not near the Fallopian canal, the face was noticed to twitch repeatedly. The upper and inner walls of the mastoid and tympanum were very firm and nowhere carious. The sigmoid groove was opened and the lateral sinus aspirated, but only venous blood obtained.

The patient gradually sank, and died at 1 P.M. the next day, without new symptoms of any kind, the temperature never going above 100° F.

Autopsy. Cerebellum adherent to the whole posterior surface of the petrous bone. An abscess, one and three-quarter inches by three-quarters of an inch, at the base of the cerebellum, opening against the posterior surface of the petrous bone. Very abundant fluid in the ventricles, and the convolutions of the cerebellum somewhat flattened, probably from this fluid. Cultures from the abscess showed pneumococci, streptococci, and numerous other organisms.

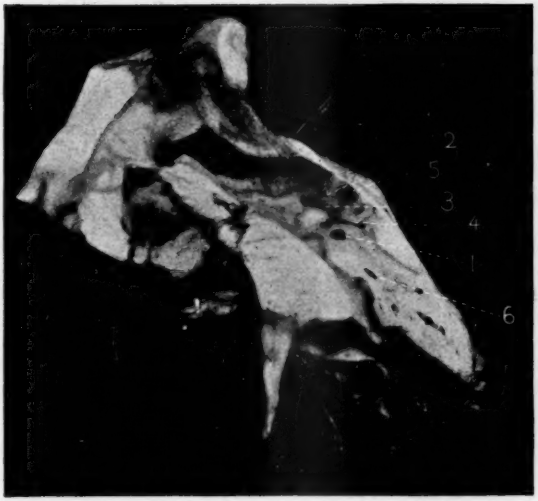
In the lateral sinus at the seat of exploration was a small, adherent thrombus, the size of half a pea; cultures from it were sterile. Other organs healthy.

Petrous bone. There was a small mass of cerebellar substance adherent to the dura (half an inch by a quarter of an inch), between the internal meatus and the aquæductus vestibuli, but no ulceration of the dura. The internal meatus was filled with pus, and the auditory and facial nerves discolored and fused together. The entire horizontal portion of the

Fallopian canal was destroyed by caries, and the facial nerve ran directly through the tympanum; above this was a carious opening into the vestibule and superior semicircular canal, three-eighths of an inch long and one-eighth of an inch wide, and another carious opening, one-eighth of an inch wide, into the external semicircular canal, and still another carious opening, one-eighth of an inch long, into the carotid canal.

Anatomical diagnosis. Abscess of the cerebellum in direct connection with the internal meatus; carious perforation from the tympanum to the vestibule, and a mixed infection of the brain from the vestibule along the meatus internus.

FIG. 1.



1. Foramen ovale. 2. Caries into vestibule. 3. Caries into external semicircular canal. 4. Caries of Fallopian canal with a wire where the nerve was exposed. 5. Caries into superior semicircular canal. 6. Caries into carotid canal.

CASE II. *Chronic suppuration of the tympanum; caries into labyrinth; arachnitis of cerebellum and cerebrum; abscess of cerebellum from infection through the aquæductus vestibuli.*—A. C., aged thirty-two years, a robust man, had had a chronic suppuration of the right ear for years without treatment, and entered the infirmary on January 10, 1898. Three weeks before entrance he began to have pain in the ear, but not severe enough to prevent him from work. On December 30th, while at work, he suddenly had severe vertigo, with vomiting, obliging him to go to bed. The vomiting continued for three days, then ceased, and did not recur. The vertigo continued and kept him in bed. Four days before entrance the pain in the ear and vertigo became much more intense, with pain throughout the frontal region. On January 8th he had a chill.

On entrance he was weak, complaining constantly of severe pain in

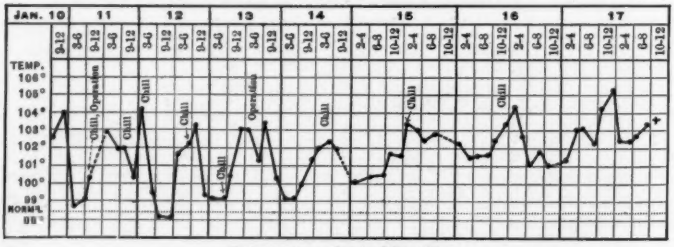
the frontal region and vertigo on moving; intellect clear; pupils reacting and equal; reflexes of knees normal; no optic neuritis and no paralysis. Right meatus filled wth a polypoid growth, which was immediately removed with a snare. No sensitiveness of the bone on pressure. Lungs healthy. Temperature 102.8° F. and pulse 105. Ice-bag to the head and morphine. Skull index of breadth 77 (mesocephalic).

January 11*th*. A blood-count gave 20,100 white corpuscles. Under ether a full tympano-mastoid exenteration was performed. The mastoid was sclerosed and very hard; the antrum filled with desquamative material and with carious walls; the anterior superior quadrant of the drum membrane destroyed; the malleus had lost its entire head by caries; the incus was not found, having probably been destroyed by caries; the stapes was in position, but its head and one crus were carious; it was not removed. No carious fistula to the brain could be discovered nor any caries of the upper or inner walls. After the operation there were slight chills at 11 A.M. and 7 P.M.

12*th*. Two slight chills and a slight delirium, but he took nourishment well.

13*th*. A severe chill, lasting twenty minutes, at 6 A.M. Headache rather less, and says he feels "fairly comfortable." On deep pressure some tenderness was found in the upper posterior part of the neck on the right side. On consultation with Dr. S. J. Mixter it was decided to explore the brain, and under ether the lateral sinus was exposed from the middle to the lower part of its descending portion by removing the inner cortex of the mastoid. The sinus walls and dura were perfectly healthy; no cording of the vein; an aspirating needle was passed into the sinus, but only venous blood obtained; subsequent cultures from this blood were negative. Exploration with a probe was made for one and one-half inches along the posterior surface of the petrous bone outside of the dura, with the expectation of finding pus about the meatus internus or aquæductus vestibuli, but only clear fluid was obtained. Subsequent cultures from this fluid, however, showed streptococci and diplococci pneumoniæ. During recovery from the ether there was a slight chill.

FIG. 2.



Temperature chart of Case II.

14*th*. Delirious at times.

15*th*. Slept all night. Chill at 2 P.M., with a temperature of 106° F.

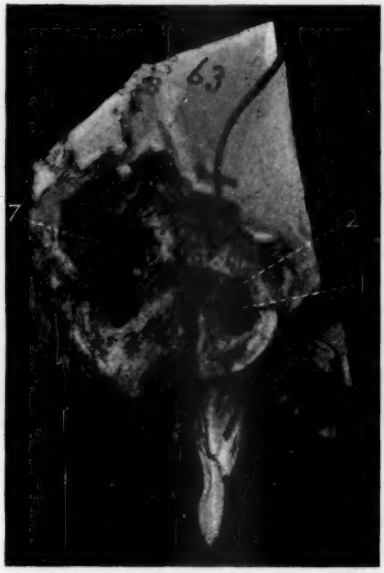
16*th*. Slept quietly all night. Took nourishment well. Intellect dull; headache at vertex; chill at 12 M. Blood count at 7.30 P.M., 20,000 white corpuscles.

17*th*. Stupor, subsultus, very free perspiration all the time; suspicion of flatness of right side of face and external strabismus of the left eye. Died quietly at 12.45 P.M.

Autopsy. Cerebrum. Cerebro-spinal fluid opaque, and culture showed bacillus pyocyaneus and streptococci. Slight opacity of vessels of pia, and cultures gave bacillus pyocyaneus. Dura smooth, not adherent.

Cerebellum. Slight purulent deposit on its upper surface and a more abundant deposit on its base on both sides. On the right side, on its inferior surface, the pia was inflamed over an area three-fourths of an inch in diameter, corresponding in situation to the aquæductus vestibuli. Within this was a fistulous tract half an inch long, leading into an abscess about one inch in diameter, situated in the extreme anterior part of the right digastric lobe. A culture from this abscess gave bacillus pyocyaneus and streptococci.

FIG. 3.

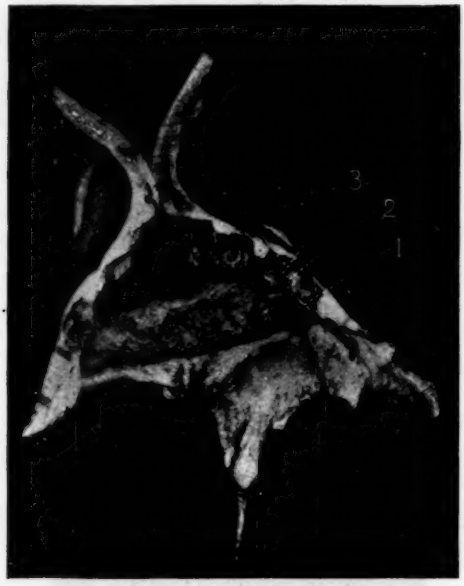


1. Foramen ovale. 2. Caries into vestibule. 7. Opening into sigmoid groove.

Petrous bone. The dura was healthy except at the aquæductus vestibuli, where there was in the bone a collection of pus as large as a bean. The auditory nerve within the internal meatus was swollen and discolored, the facial nerve was not affected macroscopically. Within the lateral sinus, at the seat of aspiration, was a minute adherent thrombus, firm, and apparently not infected. The rest of the sinus was healthy and the walls perfectly smooth and glistening. After maceration the bone showed caries of the medial and lower wall of the aditus and of the lower posterior edge of the promontory, and also a carious perforation of the external semicircular canal into its ampulla, one-eighth of an inch long and one-sixteenth of an inch wide.

Anatomical diagnosis. Arachnitis of cerebrum and cerebellum. Abscess of the right digastric lobe of the cerebellum, communicating by a fistulous tract with a collection of pus at the orifice of the aquæductus vestibuli. Carious perforation from the tympanum to the external semicircular canal, and infection through this to the vestibule and thence along the aquæductus vestibuli to the brain.

FIG. 4



1. Foramen ovale. 2. Caries into vestibule. 3. Caries into external semicircular canal.

CASE III. *Chronic suppuration of the tympanum; caries into labyrinth; encephalitis of cerebellum, with abscess from infection through the whole labyrinth.*—T. P., aged eighteen years, previously healthy; entered the infirmary on January 29, 1898. A chronic suppuration of the left tympanum had existed for one and a half years. Ten days before, without known cause, he had sudden vertigo, followed by much pain in the ear and frontal headache, great increase in the deafness, but no vomiting or fever. He was obliged to remain in bed. Four days before entrance facial paralysis showed itself. Examination showed the left drum membrane red, much infiltrated, and with a perforation in the middle of its posterior segment, through which a probe detected bare bone. All branches of the left facial were completely paralyzed, but the tongue and palate were not affected.

The hearing tests were:

W. r. 60/60″ : 1. 0/60″ : V. r. 20/25′ : 1. 1/(45′)?

F. 512 v. s. $\frac{AC}{BC} = \frac{20''}{10''}$ r. 20/8″ : 1. 0/6.″ F. 512 v. s. r. > 1.

Tone limits: High r. n. : l. n. Low r. 40 v. s. : 1. 1024 v. s.

The blood showed 14,000 white corpuscles. Skull index of breadth 78.2 (mesocephalic). Temperature 99° F. Pulse 60.

January 30th. A full tympano-mastoid exenteration was performed, the bone being sclerosed. The sinus was exposed within a quarter of an inch of the meatus and the antrum was opened from the meatus backward. The malleus, incus, and membrana tympani were removed. The long process of the incus had been destroyed by caries. The facial nerve was seen crossing the tympanum, the Fallopian canal having been destroyed by caries. The inner wall of the tympanum was carious, but the roof of the tympanum and mastoid and the inner cortex of the mastoid were healthy.

31*st* and *February* 1*st*. Slight tendency to delirium, sopor from which he could be aroused with difficulty. A blood-count gave 13,300 whites. Much pain over left side of head.

2*d*. Examination by Dr. James J. Putnam showed "papillitis of both eyes, most marked in the left; knee-jerks absent in right, slight in the left; plantar reflexes less on the right than on the left; cremasteric reflexes equal in the two sides. Eyes deviate to the right, and the right one more than the left; pupils vary in size, independently of the light." Temperature 99° F.

Under ether the opening in the inner mastoid wall was enlarged by gouges and rongeurs forward, exposing the cerebellum in front of the lateral sinus. The dura and sinus were healthy, the latter unusually large. Exploration outside of the dura along the petrous bone was negative. After thorough cleansing with sterile salt solution the dura was incised by a short, straight incision, evacuating two or three drops of clear cerebro-spinal fluid, subsequent cultures from which, however, gave staphylococcus. Immediately following this was a drop of thick, opaque matter, which, on cultures afterward, showed staphylococcus. A director was then passed into the cerebellum, parallel with and one-quarter of an inch behind the posterior surface of the petrous bone, for an inch and three-quarters, but nothing was obtained. Still feeling confident that there was an abscess connecting with the passages of the labyrinth, a pair of narrow forceps, closed, was passed into the opening, spread and then withdrawn, but no pus was evacuated, although a little disorganized brain tissue exuded, from which cultures afterward showed staphylococcus. Another exploration was made backward with a director to the depth of one and a third inches, but nothing found.

3*d*. He was more rational and better in every way apparently. The dressings of ear and mastoid were changed, but those of the brain not touched.

4*th*. Dr. Putnam reported the optic neuritis increasing in both eyes.

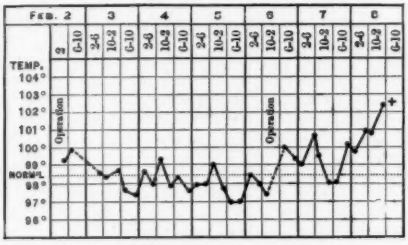
5*th*. The sopor returned, he took little nourishment, and the whole scalp of the occiput became enormously œdematous and so continued.

6*th*. After consultation with Dr. S. J. Mixter the cerebrum was exposed just above the meatus and the roof of the tympanum examined,

but found healthy. The dura was normal and was not opened. The cerebellum was exposed behind the lateral sinus and again explored in three directions to the depth of an inch and a quarter, with negative result.

7th. The sopor passed into coma, and he died on the 7th, the temperature rising in the last six hours to 102.5° F., having previously been but little above the normal.

FIG. 5.



Temperature chart of Case III.

Autopsy. Great œdema of the scalp just above the superior curved line of the occiput. Cerebrum normal. Cerebellum adherent to the dura for one-quarter of an inch over aquæductus vestibuli and also at the seat of exploration. In the anterior part of the left digastric lobe of the cerebellum, and separated from the point of the first exploration by one-quarter of an inch of healthy brain tissue, was an abscess one and a half inches long, three-quarters of an inch wide, and one-half an inch thick, filled with thick, creamy pus, encapsuled by a thin (pyogenic) membrane. There was a zone of dotted and striated bright red tissue parallel with and a quarter of an inch inward from the posterior edge of the cerebellum on both sides, and the whole cerebellum was softer than normal (encephalitis). No fistula communicating with the bone was found, and there were absolutely no signs of the exploratory punctures. The surface of the cerebellum at the seat of operation was slightly discolored and softened.

Petrous bone. A bit of cerebellum, apparently healthy, was adherent at the aquæductus vestibuli, and another bit of brain substance adherent at the internal meatus. The auditory nerve was swollen and discolored at the cribriform plate, but the facial nerve was macroscopically healthy there. The facial nerve in its horizontal portion in the tympanum was freely exposed. There was extensive caries of the entire osseous labyrinth, viz., caries above the fenestra ovalis into the vestibule, destruction of the entire horizontal portion of the Fallopian canal, carious opening into the external semicircular canal, caries into the superior semicircular canal, caries of the inner and upper walls of the antrum extending to the upper and posterior surfaces of the petrous bone, caries of the Fallopian canal from the internal meatus to the geniculate ganglion, and superficial caries of the posterior surface of the petrous bone and of the internal meatus.

Anatomical diagnosis. General encephalitis of the whole cerebellum

with abscess of the left digastric lobe. Caries of the entire osseous labyrinth.

FIG. 6.

1. Foramen ovale. 2. Caries into vestibule. 3. Caries into external semicircular canal. 4. Caries of Fallopian canal with a wire where the nerve was exposed. 5. Caries into superior semicircular canal with a bristle passing through and out at the caries of the vestibule.

CASE IV. *Chronic suppuration of the tympanum; caries into labyrinth; no brain disease.*—T. B. H., aged thirty-one years, not robust, with a chronic suppuration of the left tympanum since childhood, entered the infirmary on January 5, 1897. Six years before a polypus was removed from the ear, and afterward the discharge diminished, but never ceased, although the ear was free from pain. On January 1st, while at work, he suddenly felt so dizzy that only by holding to his bench could he keep from falling. He was unable to see, and "everything seemed to be going upward." There was no nausea. The next day shooting pain began in the ear and on the left side of the head, and the dizziness came on whenever he tried to sit up. On January 4th he had a slight chill.

On entrance examination showed a marked general hypertrophy of the left mastoid and sensitiveness on pressure in its posterior and superior portions. The drum membrane was largely destroyed, but no tympanic caries could be felt. No optic neuritis (Dr. Quackenbos). Pain over the left side of the head and vertigo on sitting up, but no nausea. Face pale and anxious.

Tests:

W. r. 30/100″ : 1. 1/100″ : V. r. 5/25′ : 1. 1/35′. F. 512 v. s. r. $<$ 1.

F. 512 v. s. $\frac{AC}{BC} = \frac{20''}{10''}$ r. 24/14″ : 1. 4/14″.

Limits: High r. n. : l. n. Low r. 26 v. s. : l. 256 v. s.

Reflexes normal. Skull mesocephalic. Temperature 98.4° F. Pulse 72.

January 6th. During the night chilly, and pulse fell to 44 and temperature to 97° F., but after application of artificial heat became normal by morning.

7th. No leucocytosis by blood-count. Slept well till 5 A.M., when he awoke "feeling weak and as if his body was going to pass through his head." No pain. Pulse 48, and strong.

8th. Again awakened by "weakness."

10th. Anorexia and nausea. A decidedly tender point three inches posterior to auricle and one-quarter inch below superior curved line of the occiput.

After consultation with Dr. Putnam, a full tympano-mastoid exenteration was done under ether. Bone densely sclerosed, the aditus and antrum full of desquamative material. On the posterior part of the inner wall of the aditus was a carious opening, slit-like and one-eighth of an inch long, into which a probe could be passed for one-eighth of an inch (the external semicircular canal). The edges of this were curetted. All the rest of the antrum, aditus, and tympanum were of ivory-like bone without caries.

13th. Pain in the stomach and constant nausea. No pain in head or dizziness. Nystagmus in both eyes on looking to the right, but never on looking to the left. Nutritive enemata ordered. Temperature 99° F.

14th. No nausea or pain.

15th. Much better; nystagmus less; some dizziness; subjective noises in the ear. Convalescence was uninterrupted from this time.

23d. The nystagmus and vertigo had entirely disappeared, and he went out for the first time. The exposed bone gradually covered with granulations, became covered with epidermis, and on January 30th was covered by a firm, dry epidermis, leaving an opening behind the ear one-half by three-sixteenths of an inch, and from the antrum a membrane had formed about half-way across the tympanum.

The hearing tests were:

W. l. 0/100″ : V. 1. 1/40′ (?) F. 512 v. s. $\frac{AC}{BC} = \frac{20''}{10''}$: 1. 0/7″.

Tone limits: High l. n. Low l. 2048 v. s.

ANALYSIS OF THE SYMPTOMS.

R. C. S.	A. C.	T. P.	T. B. H.
O. M. S. chr. r. 20 yrs.	O. M. S. chr. r. years.	O. M. S. chr. l. 1½ years	O. M. S. chr. l. 25 years.
Sudden vertigo.	Sudden vertigo.	Sudden vertigo.	Sudden vertigo.
Pain in ear.	Pain in ear.	Pain in ear.	Pain in ear.
Headache, vertex, bilateral.	Headache, frontal, bilateral.	Headache, frontal, bilateral.	Headache, unilateral, left.
Divergent strabismus, both.	External strabismus, l.	.....	Nystagmus on looking to r.
No optic neuritis.	No optic neuritis.	Optic neuritis, most in l.	No optic neuritis.
.....	Knee-jerks present.	Knee-jerks absent in r.	Knee-jerks present.
.....	.....	Facial paralysis from ear.	
.....	Nausea.	No nausea.	Nausea.
No chills or fever.	Chills and fever.	No chills or fever.	No chills or fever.
.....	Leucocytosis 20,100.	Leucocytosis 14,000.	No leucocytosis.
Delirium at end.	Delirium at end.	Delirium at end.	No delirium.
Sclerosis of the bone.	Sclerosis.	Sclerosis.	Sclerosis.
Caries into labyrinth.	Caries into labyrinth.	Caries into labyrinth.	Caries into labyrinth.
.....	Arachnitis of cerebrum and cerebellum.	Encephalitis of cerebellum.	No brain disease.
Abscess of cerebellum 1¾″ x ¼″.	Abscess of cerebellum.	Abscess of cerebellum 1¾″ x ½″ x ¼″	
Infection from meatus internus.	Infection from aq. vestibuli.	Infection from whole labyrinth.	

The above analysis of the symptoms in the four cases affords some interesting comparisons. In all a chronic tympanic suppuration was running its course, without other symptoms than otorrhœa, when there was a sudden attack of vertigo, followed soon by dull pain in the depth of the ear. In one (T. P.) this was noticed to be accompanied by a marked increase in the deafness. At this time the penetration and infection of the labyrinth undoubtedly occurred, the vertigo being due to irritation of the cristæ acusticæ of the ampullæ of the semicircular canals. In all four headache was a prominent symptom. In the three cerebellar abscesses it was bilateral; in two of these frontal, and in the other at the vertex. In none of them was there any complaint of the occipital region. In the fourth case, of simple caries without brain disease, the headache was unilateral on the side of the affected ear, as is not uncommon with tympanic suppurations alone. Paralysis of the abducens (sixth) occurred in two, in one bilateral, in one unilateral, on the opposite side from the ear disease; it was perhaps due to pressure on the base of the cerebellum, perhaps to a central lesion; its cause

could not be proved directly at the autopsy. Optic neuritis was present in only one case, that of extensive encephalitis with abscess of the cerebellum. It was absent in all the others. In my experience with otitic brain disease its absence has no meaning whatever. Its presence with other symptoms is confirmatory of brain disease, but is of little value in defining or localizing the lesion. The facial paralysis of T. P. I regard as sufficiently explained by the condition of the tympanum. It was due to pressure on the nerve in the Fallopian canal from extension of the inflammation through carious destruction of part of the canal. In only one case were there general septicæmic symptoms (A. C.); in the others fever was absent till nearly the end. Leucocytosis was present in two of the cases of cerebellar abscess, and in the third one no blood-count was made. It is interesting to note the presence of a moderate leucocytosis in T. P., although infection of the general system was absent, there being no chills or fever. Nystagmus on looking away from the diseased ear was well marked only in T. B. H. (simple caries). The presence of this symptom with disease of the labyrinth, although not always present, has been noted by German observers. It should not be regarded as a brain symptom, and was seen only in this one case of simple labyrinthine inflammation.

Sclerosis of the bone existed in all the cases—a condition always likely to be found in any case of long-continued tympanic suppuration, even when there have been no symptoms pointing to the mastoid. The situation of the caries was practically the same in all of these cases, viz., on the inner (labyrinthine) wall of the aditus and epitympanum. In all four the external semicircular canal had been perforated where it comes against the aditus wall. In the three cases in which accurate dissection was possible the wall of the vestibule just above the Fallopian canal had been destroyed, and in two of them the entire tympanic horizontal portion of that canal had also been destroyed.

The cerebellar abscesses were of about equal size and situated in the anterior and lower portions of the cerebellum on the same side as the ear disease, one of them opening directly against the meatus internus, the other two separated from the bone by respectively one-quarter and one-half inch of brain substance. In one of these two a distinct fistula connected the abscess with the labyrinth. In the other, although no fistula was found, the cerebellum was adherent to the dura over the aquæductus vestibuli. The arachnitis of A. C. was of only moderate intensity in the cerebellum and slight in the cerebrum. The connection between the two portions of the brain could not be discovered, and I regard it as a development of only the last day or two of life, and not the cause of the earlier symptoms. The intensity of the redness and the absence of extensive softening in the general encephalitis of T. P. made me think that this also was of very recent origin.

In all of the cases an accurate diagnosis before operation was absolutely impossible. In R. C. S. and T. P. abscess of the brain was the probable diagnosis, but whether cerebral or cerebellar could not be determined. In A. C. the repeated chills, high fever, and marked leucocytosis led me to make a probable diagnosis of phlebitis of the sinus, but in all of the cases the diagnosis was tentative, dependent on what was found on opening the ear cavities. They all show the value of the tympano-mastoid exenteration in exposing the whole interior of the bone, and thus showing the course which the inflammation has taken in reaching the brain, and thus determining at least the situation of the brain-disease, if not its character. The finding of the caries into the labyrinth, the absence of caries in all other parts (the roof or internal mastoid wall), the exposure and exclusion of disease of the sinus by aspiration pointed to the labyrinth as the direct route of infection. In every case this proved to be correct.

Otitic abscesses of the cerebellum are due to extension of the inflammation either through the inner wall of the mastoid or through the labyrinthine passages. In the former the abscess is in the posterior portion of the cerebellum; in the latter in the anterior portion. The posterior abscesses can be reached by removing the inner wall of the mastoid, and then, by rongeurs or gouge and mallet, carrying the opening backward to any desired extent, thus exposing the cerebellum below and behind the lateral (sigmoid) sinus, thus giving most thorough and efficient drainage.

The anterior abscesses, like those in this paper, offer much greater difficulties. They lie so far forward that to reach them from an opening behind the sinus involves puncturing the brain for from an inch to an inch and a half, and drainage for this distance nearly on a level must be inefficient. To reach them from an opening in the occipital bone below the superior curved line requires a greater length of puncture and gives even less favorable conditions for drainage. From a point just in front of the sinus, however, the distance to the orifice of the aquæductus vestibuli is only about one-fourth of an inch, and to the meatus internus about three-fourths of an inch. The posterior surface of the petrous bone can be removed for some distance forward and inward from this point, however, thus reducing these distances one-half. This was the method adopted in the cases of A. C. and T. P. for exposing the cerebellum, and in similar cases of anterior abscesses I should use it again. It has the advantage of allowing the surgeon to explore outside of the dura along the posterior surface of the petrous bone, which cannot be done in most cases from an opening behind the sinus on account of the great projection of the vein. It has the disadvantage that the opening can never be very large, about half an inch in diameter being its greatest size. The removal of the posterior surface of the

petrous, where the bone is very thick, solid, and lying deep, is much facilitated by the use of gouges slightly curved on their hollowed sides for half an inch at the ends.

Whether these anterior cerebellar abscesses will prove to be as amenable to treatment as the posterior ones experience has yet to show. The cases cited show the difficulties of reaching the lesion, even after it has been located, for in all three the preliminary exenteration showed that the labyrinth was the path of infection.

In R. C. S. the serious condition of the patient seemed to forbid further operation. In A. C., before opening the dura I pushed it inward with a director and explored along the posterior surface of the petrous bone for an inch and a half, fully expecting to find pus near the meatus internus, assuming, wrongly as it turned out, that with extension from the labyrinth I should get indications of it outside of the dura, and failing to get these I desisted from explorations of the cerebellum, which might have revealed the abscess lying within half an inch of the seat of operation. I also made the mistake of not removing enough of the posterior surface of the petrous to get a good view of the dura near the aqueduct. This case also taught me that with the most careful exploration it is easy to miss a small, extradural collection of pus, for, as the autopsy showed, there was a collection at the aqueduct as large as a bean, but encapsuled, so to speak, by adhesions to the bone, so that my director had slipped by it, both above and below, without opening it. In the third case, of T. P., utilizing my experience in the last case, and exploration along the posterior surface of the petrous being negative, I opened the dura, and, obtaining a drop of opaque fluid (subsequently proved to be infective), explored the cerebellum with an ordinary director, choosing this because it is well known that the contents of the brain abscesses are often very dense. Obtaining nothing, a pair of forceps was passed in, opened, and withdrawn, thus tearing an opening one-quarter of an inch long, but without result. The autopsy showed that both of these instruments must have gone, without any question, directly into and through the seat of the abscess. Four days after a second exploration, directly through the seat of the abscess, was equally without result. It might be said that at the first operation the abscess had not fully developed, but this would not hold for the second operation, which was only twenty-four hours before an abscess one and a quarter by three-quarters by half an inch was found. That merely one-quarter of an inch of brain tissue should offer such obstruction to evacuation by such a large opening was a surprise to me.

[NOTE.—Since this paper was written a series of observations reported to the Boston Society of Medical Sciences, November 18, 1898, show that leucocytosis is present in 79.5 per cent. of uncomplicated tympanic suppurations, and therefore fails to be of diagnostic value.]

FURTHER CONSIDERATIONS OF THE MECHANISM OF EAR VERTIGO AND ITS RELIEF BY REMOVAL OF THE INCUS.

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In The American Journal of the Medical Sciences, October, 1896, I published my observations in a number of cases of ear vertigo and recorded my experiences with the surgical removal of the incus for relief of this disease. In this paper I present some original considerations as to the mechanism and paroxysmal nature of chronic ear vertigo, or chronic tympanic vertigo, as I prefer to name it, because the cause of it originates in chronic disease of the tympanic cavity, and append the record of a case of parotitic ear vertigo cured after a year's duration by a removal of the incus. It is the second case of chronic ear vertigo consecutive to mumps I have entirely cured by removal of the incus. The first case was reported in the article in this Journal referred to above.

Unfortunately, all forms of ear vertigo are usually and indiscriminately called "Ménière's disease." The latter is indeed ear vertigo, but ear vertigo is not always "Ménière's disease." Ear vertigo may be due to disease in the external, middle, or the internal ear. The term "Ménière's disease," if it means anything definitely, means internal ear vertigo, due to an apoplectiform lesion of the labyrinth of the internal ear; but there is little or no evidence that such lesions ever occur in the internal ear without previous catarrhal disease in the middle ear, the capillary bloodvessels of which are intimately connected with those of the internal ear. Middle ear vertigo, or tympanic vertigo, is due primarily to chronic catarrhal disease in the tympanic cavity and the consequently altered condition and mechanism of the ossicles of hearing. External ear vertigo is due to disease in the external ear.

All of these three forms of ear vertigo present very similar symptoms, such as are termed "Ménière's symptoms," viz., more or less deafness and tinnitus, with paroxysmal vertigo, nausea, vomiting, reeling, and often falling, but no loss of consciousness. The last-named symptom is a ready means of differential diagnosis between ear vertigo and epilepsy, alcoholism, and apoplexy, with all of which ear vertigo is sometimes confounded. There are two forms of what may be termed pseudo ear vertigo, viz., vertigo due to a tumor in the tract of the auditory nerve and vertigo due to traumatism of the ear in connection with traumatism of the cranium. In both of these pseudo ear vertigoes the cause does not arise in the ear, but from irritation conveyed to it. In these cases vertigo is more or less constant, and rarely if ever as violent as in the pathognomonic paroxysms of true ear vertigo.

Ear vertigo is due to irritation emanating from some part of the auditory apparatus and conveyed through the ampullæ of the semicircular canals to the motor filaments of the auditory nerve, the peduncles, and the cerebellum; hence the disturbed coördination called ear vertigo. Such irritation may be excited either by undue retraction and impaction of the stapes in the oval window, and consequent compression of the labyrinth fluid and the ampullæ, as in the late stages of chronic catarrhal otitis media. If engorgement of the labyrinth and pressure upon the ampullæ from within the cranium be present, as in parotitic metastasis, such pressure-irritation may be increased at times by sudden retraction and impaction of the chain of ossicles and the foot-plate of the stapes, as occurs in sudden movements of the head, or in an accommodative contraction of the tensor tympani, unnoted by the normal labyrinth, and a paroxysm of ear vertigo takes place. With the labyrinth unduly engorged, as in a case of metastasis, ear vertigo occurs if a sudden increase in the quantity of labyrinth fluid takes place when the stapes is held too firmly in the oval window to yield to this pressure upon its foot-plate from within. This amounts to the same force as sudden impaction of the stapes, since the labyrinth space is compromised by the failure of the stapes to move outward, and ear vertigo results from pressure-irritation in the ampullæ. The latter process is most likely to take place in the late stages of chronic catarrh of the middle ear; but in both instances the process is essentially a mechanical one, viz., a disturbance in the muscular tension and mobility of the auditory apparatus in the middle ear, and we have therefore to deal with a mechanical disease.

The paroxysmal nature of ear vertigo can be explained only by assuming that it is due to temporary increase in retraction and impaction of the stapes in the oval window or temporary engorgement of the labyrinth from within, without compensatory yielding of the stapes, and a consequent pressure on the labyrinth water and the ampullæ. That such is the mechanism of ear vertigo is demonstrated by the curative effect of removal of the incus and liberation of the stapes. Why true ear vertigo occurs paroxysmally cannot be easily explained, but I venture to suggest that it is due to varying degrees of tension in the chain of ossicles or in the labyrinth fluid. The latter, being a part of the lymph system of the subarachnoid space (Hasse), must be subject to varying conditions of tension, as are the ventricles of the brain or the cerebro-spinal fluid. Ordinarily the compensatory yielding of the fenestræ of the labyrinth toward the drum cavity is sufficient to prevent undue pressure in the ampullæ and vertigo. If, however, these yielding points are stiffened as in chronic middle-ear catarrh, in which there is always more or less retraction and impaction of the stapes and thickening of the membrane of the wound window, then either an

increased quantity of endolymph or perilymph or both, emanating from the cranial cavity, or a spasmodic or further retraction of the chain of ossicles and impaction of the stapes from tympanic causes, as occur in chronic aural catarrh, is competent to excite a paroxysm of ear vertigo.

If the liability to these paroxysmal impactions of the stapes can be prevented and greater freedom given to the movement of the stapes outward when its foot-plate is pressed upon from within, ear vertigo from the causes mentioned can be prevented. Such immunities can be granted by removal of the incus and consequent liberation of the stapes. In twenty-seven cases of ear vertigo in which I have thus liberated the stapes, entire freedom from incapacitating attacks of ear vertigo has followed the operation. This relief has not always come at once, as long a time as six months having elapsed in some instances before entire relief has been obtained; but in some of the worst cases immediate relief has followed the removal of the incus, as in the case I have reported below. In a few cases the tinnitus has been entirely relieved and in the rest of the cases greatly diminished by the operation. The hearing, uniformily very defective in true ear vertigo, has been uninfluenced by this operation.

The following case of ear vertigo presents much to interest both the general and special practitioner:

Mr. J. W. S., a strong, healthy man, of good habits, conductor on a trolley car, consulted me for the first time on October 14, 1898. He stated that in September, 1897, he had contracted mumps from his little son and had had the disease on both sides. The left parotid gland was attacked first, and then, four days later, the right parotid was attacked. Four days later the left testicle became greatly swollen and intensely painful, and four days later the right testicle was attacked, but less severely. It is stated that no alteration in sexual power has resulted from the orchitis. Two or three days after the orchitis had appeared on the right side the patient had an attack of pleurisy on the right side, which lasted from ten to twelve days, with fever and great pain. The metastatic tendency of this malady is thus sharply demonstrated in this case. On the left side there were pain, tenderness, and swelling about the ear, with shooting pains in the ear, unattended, however, with discharge. Before the parotitis both ears were entirely normal. While still confined to the bed with mumps the patient perceived tinnitus in his left ear and noticed that he was deaf in this ear. As soon as he was able to get up and move about he observed a marked tendency to attacks of vertigo, the tinnitus and deafness continuing. Attacks of vertigo were excited by rapidly moving objects, by his own sudden and voluntary movements of his body or eyes, and also by the rapid motion of the trolley car when he resumed his duties as conductor. The apparent motion of objects has always been toward his left side, and he has felt a tendency at times to reel and fall toward his left. Preceding any vertiginous attack there has been an increase of tinnitus in his left ear, and usually a coppery taste in his mouth, perhaps most marked on the left side of his tongue. This latter gustatory prodrome

of an attack of ear vertigo I have never noted before. An increase of tinnitus before an attack of tympanic vertigo is pathognomonic.

After an absence from work for six weeks he resumed his duties as car conductor, but could work only off and on between November 15, 1897, and May 8, 1898, being interrupted by frequent attacks of vertigo, nausea, and vomiting. The longest period of freedom from ear vertigo was two weeks. Three or four times in the above-named period of six months his attacks were so bad while conducting his car that he had to close his gates, lie down in the car, and return to the car-house.

From May 8th to October 14, 1898, the attacks of ear vertigo diminished in frequency but increased in intensity. He felt great timidity in going about alone, and stopped work entirely. Such agorophobia is quite common in chronic ear vertigo.

During all this period of about a year he consulted a number of physicians, some of whom recognized the nature of his malady as an aural one, while others apparently did not. Neither their local nor general treatment gave the patient relief. In October, 1898, Dr. A. G. Miller recognized his malady as ear vertigo, and sent him to me for operation.

Examination at that time revealed a normal membrana on the left side, but profound deafness; conservation of bone conduction for the tuning-fork; constant tinnitus; general health excellent; unwillingness to conduct his car for fear of vertigo and falling.

Having established the existence of chronic tympanic vertigo in this case, removal of the incus was proposed, the patient placed in a private room of the Presbyterian Hospital, and on October 18, 1898, he was ether ized, and the external auditory canal sterilized with formalin solution (1 : 1000) and illuminated by an electric head lamp. A long incision was then made in the posterior periphery of the membrana, beginning behind the short process of the hammer and running almost half-way around the membrane. There was no bleeding, and the incus-stapes joint was thus well exposed. The incus was then detached from the stapes by my incus hook-knife, drawn downward into the atrium, and removed by slender foreign-body forceps (Sexton's pattern). The stapes head was now plainly seen, and when touched with a probe was found to be normally movable. The next day the stapes was plainly visible in position. The hearing for the voice apparently slightly increased. A little discharge of clear, pink serum came from the ear. Tinnitus unchanged. There being no tendency to vertigo, the patient began his work as car conductor four days after the operation, and has continued to do so up to the present time, though ten days after the operation he took cold, and had a mild attack of acute otitis media in the ear operated upon. This ear discharged for a month and then ceased, the perforation closing. December 2, 1898, I made a note that the deafness was still great and the tinnitus continuous in this ear, but there was no tendency to vertigo, to relieve which the operation was performed. The patient is able to do full work, and was on duty twenty-six hours during the recent great snow-storm.

In the case reported above parotitic metastasis occurred in the left internal ear and probably some degree of catarrhal inflammation in the middle ear. The metastasis in the labyrinth produced engorgement of that cavity and destruction of hearing, but not of the special irritability

of the ampullæ of the semicircular canals. The ready mobility of the stapes in this case, as was demonstrated by a probe at the time of the operation, rendered the patient specially liable to an attack of vertigo from a sudden retraction of the ossicles by the tensor tympani, impaction of the stapes upon the over-distended labyrinth, and consequent undue compression of the ampullæ. Such liability has been overcome by the removal of the incus and the consequent destruction of the retractive power of the tensor tympani and malleus upon the stapes.

A CASE OF ISOLATED URTICARIA OF THE TONGUE, ASSOCIATED WITH ACHLORHYDRIA.

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AND

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Occasionally in individuals affected by urticaria of the skin the mucous membrane of the mouth becomes the seat of analogous manifestations. Such an involvement receives but brief mention from writers on diseases of the skin, while an isolated occurrence of urticaria upon the oral mucous membrane has apparently not hitherto been observed.

The following case seems to be unique so far as is indicated by an examination of the literature:

Local phenomena. The patient, a man, aged thirty-eight years, shoemaker by trade, was first seen October 16, 1897, for soreness of the tongue. He stated that four years previously reddened, sensitive areas made their appearance on the dorsum of the tongue, coming and going irregularly for several months, later increasing in frequency of occurrence as well as in soreness, until two years ago, when he was obliged to give up his work, in which it was necessary to hold shoe tacks in his mouth. Owing also to the sensitiveness of the tongue, he discontinued the use of tobacco, which he had formerly smoked and chewed freely. For the past two years the lingual dorsum has been almost constantly affected by sore, red areas. Recently the mucous membrane of the cheeks and lips has occasionally shown similar manifestations. The skin has at no time exhibited an eruption, so far as he can recall.

When first seen by the writer (J. L. G.) the oral cavity presented the following appearances: The dorsum of the tongue from the circumvallate papillæ to within a centimetre of the tip presents, with the exception of a normal-looking oval area in the centre, about one by one and a half centimetres in diameter, conspicuous alterations of the surface. In this affected region the filiform and fungiform papillæ are moderately

and symmetrically enlarged, are brightly reddened, and pass abruptly without other line of demarcation to the normal epithelium in the centre and at the tip of the tongue. The reddened area is traversed irregularly by conspicuous furrows and wrinkles, which can be smoothed out with the fingers, and show no actual abrasion or fissuring of their surface. There is no induration or palpable alteration in consistence anywhere apparent. The normal-looking mucous membrane at the tip of the tongue and over the oval area in the centre previously referred to is smooth and without furrows. The mucous membrane elsewhere in the mouth presents nothing abnormal. The condition of the teeth was good.

The affected portion of the tongue exhibits marked sensitiveness to mechanical, chemical, and thermic irritants. No change in acuteness of taste was apparent. Pruritus or spontaneous pain was not present.

FIG. 1.

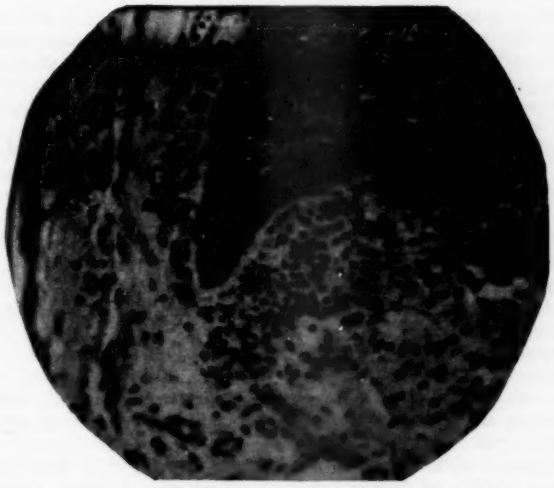
The rete mucosa shows numerous mitoses in its inferior portion. In the corium a pronounced round-celled infiltration is seen, together with several small areas of œdema. Eosin and alkaline methylene-blue. Zeiss apochrom. object. 16 mm., project. ocul. 2.

Pathological anatomy. A portion of the reddened area from the dorsum of the tongue was removed, including some of the adjacent normal-looking mucous membrane. Sections stained with polychrome methylene-blue after hardening in Zenker's fluid showed the following appearances: In the region corresponding to the macroscopically swollen and reddened mucous membrane the horny and squamous layers of the epithelium appear essentially normal, but the rete mucosa exhibits an unusual number of mitoses in its inferior portion. In the intercellular spaces a few polymorphonuclear neutrophiles are found irregularly scattered.

The corium exhibits irregular deficiencies throughout its extent, though most markedly immediately below the mucosa. These deficiencies are formed by a separation of the fibres of the corium, and are due to an œdema and not to disturbance of the tissue from the cutting, since, if sections are stained according to Unna's method by acid orcein, the deficiencies are seen to be traversed irregularly by delicate strands of fibres given off from the neighboring bundles.

In the vicinity of these widened lymph-channels of the corium there is an increased number of both fixed and free cells. The former have a vesicular nucleus, with more or less cytoplasm, and resemble the endothelial cells of the capillaries. The walls of the capillaries exhibit an increase in thickness amounting to two or three cell-layers. The endothelial cells show a distinct swelling of their cytoplasm and apparently of their nucleus. Here and there are found *mastzellen* irregularly distributed through the corium, never more than two or three in a field.

FIG. 2.



Same specimen. Zeiss apochrom. object. 2 mm., project. ocul. 2.

In the neighborhood of this endothelial proliferation there is a distinct cellular infiltration, consisting of polymorphonuclear neutrophiles and smaller cells with deeply staining nucleus and a narrow margin of cytoplasm resembling the small lymphocytes of the blood. These infiltrating cells extend in a scattering fashion to the submucosa. The bloodvessels of the corium contain a considerable number of both these forms of cells. There were no cells found having the character of plasma cells or of eosinophiles.

The process appears, histologically, to consist in a proliferation of the endothelial cells of the corium, accompanied by œdema and leucocytic infiltration in the neighborhood, together with a heightened proliferation of the cells in the rete mucosa.

Frequent examination of the tongue during a period of several months showed a rapid, continual shifting in position of the reddened areas. These were generally rounded or oval in outline and exhibited no tendency to the formation of serpiginous or gyrate figures. The eruption appeared to arise evenly and simultaneously over a given area, subsiding in a like manner. Occasionally a transitory reddening of the mucous membrane of the cheeks and lips was noted, lasting a day or two and attended by local sensitiveness to irritants. At no time was an excessive epithelial exfoliation noted, such as is seen in superficial wandering glossitis (geographical tongue; Moeller's superficial glossitis).[1]

Local applications and mouth-washes of various kinds, soothing, antiseptic, and stimulating, were employed at different times, but no effect upon the local manifestations was apparent.

The local clinical phenomena, in connection with the histological examination, led to the belief that a condition of the lingual mucous membrane existed analogous to and essentially identical with that characterizing urticaria of the skin.[2]

General phenomena (reported by H. F. H.). The patient was subject to more or less constant symptoms of digestive disturbance, and it seemed wise to investigate this aspect of the case, both with the idea of relieving these symptoms and the condition which might underlie them and also in the hope that such an investigation might throw some light upon the cause of the local condition in the tongue.

The history of the digestive disturbance covered a period of eight years. For the last four years the character of the trouble has been constant, of the same type as at present. Before that time the patient suffered from occasional attacks of an acute nature, consisting of nausea, morning vomiting, much distress, and vomiting after ingestion of food. These attacks generally followed a spree of alcoholic indulgence. They lasted in some cases a few days, in some two or three weeks, and became progressively more frequent and of longer duration until the patient gave up hard drinking, four years ago.

The symptoms during the last four years and at the time of investigation have been as follows:

Upon rising in the morning there is a sense of nausea and unrest in the stomach, a bad taste in the mouth, much eructation of tasteless, unirritating gas.

Immediately upon ingestion of food, perhaps within five minutes, there is a feeling of fulness and distress in the stomach, which frequently increases to a dull pain. The patient has to lie down for one-half hour until the distress lessens. During this period of distress, lasting one-half to one and one-half hours, there is constant regurgitation of food and much eructation of gas. The regurgitations begin at times before the meal is finished. The food is brought up in mouthfuls. As a rule, it is swallowed again, but occasionally is ejected. The regurgitated food is unirritating and of a somewhat sour taste throughout the whole period of regurgitation. In time past the later regurgitations, at an interval of an hour or more after the ingestion of food, have been

[1] See this JOURNAL, November, 1896.

[2] My thanks are due Dr. James H. Wright, director of the laboratory of the Massachusetts General Hospital, for valued assistance in the histological examinations, and to Mr Brown, of the laboratory, for the preparation of the micro-photographs.

acid and burning, but for the last year no acid taste has been noted at any time. There is no vomiting unless induced by the patient to relieve the distress, and then never of large amounts.

The symptoms occur after each meal of ordinary amount. They do not occur, or are slight, after a meal consisting of a small quantity of milk or bread and milk, or a small piece of beefsteak, but do occur with a large quantity of milk alone, or with any mixture of food sufficient to satisfy the patient's appetite. These latter facts were learned by experimentation while the patient was under my charge. The appetite is somewhat excessive.

Three hours after a meal the sense of discomfort is gone and returns only upon ingestion of food. At periods of from one to two hours after a meal the patient has spells of extreme drowsiness associated with languor and muscular relaxation. The condition is one of torpor, not sleep. All capacity of mental attention lapses, the body is completely relaxed, and saliva runs from the mouth. The spell endures one-half to one hour. It is often followed by a dull headache and general sense of malaise and inertia.

The bowels are regular. There is much intestinal gas, frequently discharged, of foul odor. The general health is poor. The strength is less good than formerly, and there is much inertia. The weight has been constant for the last two years, but is much below his former weight. These, together with the disturbance arising from the condition of the mouth described by Dr. Goodale, are all the symptoms of which the patient complains at the present time.

The family history is good.

The patient was healthy as a boy, but thinks that he ruined his constitution by excessive indulgence in tobacco and alcohol during a period of years culminating about four years ago. He admits much sexual indulgence; has had gonorrhœa, but never syphilis.

Examination. The patient is thin, not emaciated; skin sallow; pupils normal; color vision normal. The reflexes normal. Examination of thorax negative. Evidence of abnormal condition was found in the mouth as described, in the blood, in the urine, and in the digestive tract.

The urine was pale. Specific gravity 1017. Albumin present in slightest possible trace. Indoxyl increased.

Sediment contained a few small, hyaline casts, with occasional cell and abnormal blood-corpuscles adherent.

The blood showed evidence of slight anæmia. The hæmoglobin was reduced. There was evidence of some degeneration in the corpuscular elements. No evidence of pernicious anæmia.

The condition of the mouth has been described.

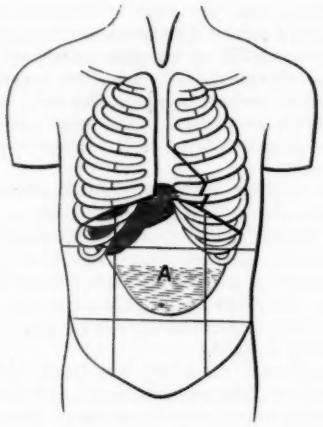
The stomach-tube was passed in the fasting stomach twelve hours after the ingestion of food. Forty c.c. of residue were withdrawn. The contents were of green color and contained bile. The reaction was alkaline. The sediment contained mucus, few epithelial cells, yeast fungi, very few remains of food. There was practically no evidence of stasis or of hypersecretion.

The empty stomach extended by percussion to one finger above the umbilicus. No tumor palpated.

With inflation the lower border of the stomach extended slightly below the umbilicus. With distention with one litre of water the lower border sank to two fingers below the umbilicus. Electrical

illumination of the stomach demonstrated the lower border at from two to three fingers below the umbilicus. The lowest point was about one inch to the left of the median line. (Fig. 3.) The upper border was apparently in the normal position. The viscus moved up and down with forced respiration. The capacity of the stomach was 1800 c.c. The spleen was in normal position. The edge of the liver could be felt just at the costal border in the right hypogastrium. The transverse colon was prominent, in normal position, and filled with gas.

FIG. 3.



The gastric contents expressed one hour after an Ewald test-meal, consisting of one roll and one glass of water, showed the following characteristics: The food appeared much as when it leaves the mouth for the stomach.

Quantity 80 c.c.; odor normal; reaction acid to litmus; no free acids present to Congo-red test; no free HCl present; no lactic, butyric, or acetic acid.

Ewald's modification of Sjoqvist test for combined HCl gave a negative result. Total acidity 0.36 gramme per mille. Rennin present, about one-quarter normal. 0.2 per cent. HCl forced into the stomach and withdrawn showed the presence of small amounts of pepsin. The filtrate of the contents did not digest coagulated egg-albumin in twenty-four hours. Starch digestion advanced. Contents obtained in a similar manner at periods of from three-quarters to two hours after a test breakfast upon ten occasions showed similar characteristics. Free HCl and combined HCl were never present. Lactic acid was never present to the clinical tests. The total acidity varied upon different occasions between 0.2 gramme per mille and 0.4 gramme. The contents were present in the stomach two hours after the meal, and upon two occasions two and a quarter hours after. The stomach was empty two and one-half hours after the meal. The amount of contents varied between 80 and 140 c.c. The contents of the fasting stomach varied in amount from 20 to 40 c.c. upon four occasions.

The acidity of the contents was due presumably to the test-meal, which in infusion had a total acidity of 0.4 gramme per mille.

The evidence of the clinical examination of the stomach showed, therefore, entire absence of the secretion of hydrochloric acid; some but diminished secretion of pepsin and of rennin; no digestion of proteid food; diminished motility. The size and position of the stomach were normal.

The condition of achlorhydria such as we have in this case occurs in conditions of atrophy of the glandular structure of the gastric mucous membrane. In cases of complete atrophy the process is said to include the cells in which the pepsinogen and rennet zymogen are elaborated, so that no traces of pepsin or of rennin can be obtained in the contents or in the acid wash-water.

It is not uncommon, however, to find traces of these ferments present in certain stages of atrophy of the stomach when the acid secreting cells have become absolutely unproductive. Certain authorities, as Van Noorden, Martius, claim that a total absence of ferment zymogen occurs in no diseased condition. This case may then be one of atrophy of the gastric mucous membrane where the atrophy has not as yet become entire. The pathological process present may be one of chronic gastritis with progressive atrophy of the glandular structure.

Achlorhydria may, however, occur as the result of a permanent disturbance of the nutrition or innervation of the gland-cells unassociated with the pathological changes in the cells which occur in atrophy. It is stated that a majority of the cases of achylia gastrica are of this nature.

It is impossible in this case in hand to determine definitely whether the pathological condition underlying the achlorhydria is one of atrophy or of disturbance of innervation of the cells.

The record of prolonged alcoholic abuse and the history of the progress of the case argue for the former condition, the so-called gastritis atrophicans.

The treatment indicated and advised was a diet consisting of food of a nature which would not irritate or burden the stomach, administered in moderate quantities in five meals daily, with reliance upon the intestinal function for digestion.

The patient was given a powder consisting of capsicum and sodium bicarbonate for the relief of the distress after meals and particularly the sense of craving for whiskey, which the patient was accustomed to satisfy at that time. Strychnine, grain $\frac{1}{75}$ t. i. d., was given to improve the motility, and belladonna to control the excessive salivation. It was obviously impossible to restore gastric digestion in this case, as the patient would have needed two quarts of dilute HCl at a meal to accomplish this.

Under this treatment the condition improved. At the end of one month of steady treatment the spells of distress after meals had practically disappeared, and the patient never had to lie down as formerly. The regurgitation had become very infrequent. The capsicum had quite taken the place of the whiskey.

All medicines except the strychnine had been discontinued.

The drowsiness was less, but was still present. The urticaria persisted unchanged.

After the commonly stated hypothesis that urticaria may be secondary to a condition of intestinal sepsis, it seemed possible that the urti-

caria in this case might be the result of a condition of intestinal sepsis consequent upon the absence of the natural antiseptic of the food in the upper intestinal tract, the free HCl, from the stomach. There were no direct symptoms of intestinal sepsis except, perhaps, the drowsiness and intestinal flatulency. It was determined, however, to treat the patient for a possible intestinal sepsis as a causal factor of the urticaria.

As stated, it was impossible to utilize the natural antiseptic, free HCl, in this case, so an artificial antiseptic (salol) was used. Five grains of salol were given from two to three hours after three of the meals. The diet was continued as before.

In the course of the next week some improvement was noted in the tongue by the patient; the soreness was still constant, but less marked, and the reddened areas appeared of less extent.

In the course of the second week the urticaria disappeared entirely from the surface of the tongue.

During the third and fourth weeks no soreness or redness upon the surface of the tongue was noted by the patient, and none was found upon examination. Under salol there had been practical immunity during a period of three weeks. Previous to this time the soreness had disappeared upon occasions for a day at a time, but never for a longer period during the several years of the disturbance. At the end of the fourth week the salol was discontinued.

In the course of the next week the urticaria reappeared upon the surface of the tongue and became again constant during the next week.

Benzo-naphtol was then administered in place of salol in doses of four grains six times a day. The condition of the tongue again improved with this treatment, but a continuous immunity, such as occurred under salol, did not obtain during the two weeks in which the benzo-naphtol was given. Upon resumption of the salol the relief of the condition again became entire and constant, and has so continued during the last month. The improvement of the condition under the benzo-naphtol as well as with the salol would tend to show that the result was due to an antiseptic action, which property these two drugs possess in common, and not to a specific action of the salol. The action was more efficient in the case of the salol. The case is to be further investigated in regard to the action of other drugs of this class of antiseptics. With the improvement in the urticaria the spells of drowsiness have to a great extent disappeared. The intestinal flatulency has also become much lessened.

The urine has shown no evidence of a deleterious effect of the salol upon the renal functions.

The condition of the stomach has remained good as far as symptoms are concerned. The symptoms of distress after meals and of regurgitation occur at present very infrequently.

The stomach is not infrequently empty two hours after an Ewald meal, while during the first two months of treatment the emptying never occurred before two and one-half hours This suggests an improvement in the motility of the organ. The condition of the secretions is unchanged.

The patient is much stronger and works regularly.

At the time of writing there is no evidence of urticaria upon the tongue and there has been none during the last month.

[NOTE.—September 1, 1898. The patient having changed his residence, no further experimentation has been possible. Three months after this article was sent to press patient wrote that no return of urticaria had occurred. During these months had taken salol gr. iij three times daily for four successive days of the week, omitting it on the other three days.]

ENTERO-PLASTIC OPERATION TO OVERCOME OR PREVENT STENOSIS, WITH ESPECIAL REFERENCE TO THE SPUR IN PRETERNATURAL ANUS.

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THE principle of overcoming a stenosis of a canal by transverse union of a longitudinal incision, as applied by Heinecke-Mikulicz on the pylorus and by me on the ureter, is applicable in any portion of the intestinal tract below the duodenum wherever the mechanical conditions will permit.

The longitudinal incision or opening should be made in the middle of the convex surface—that is, equidistant from the two sides of the mesentery, so as not to interrupt blood-supply by the division of large vessels in the intestinal wall. Free mobility of the loops of intestine and intact peritoneal covering are desirable conditions, but the latter is not absolutely necessary. In places where the intestine has no mesentery and where there is a limit to the infolding or bringing into apposition of the convex surface or the surface of the intestine opposite the mesentery, as the cæcum, extraperitoneal border of the rectum or flexures of the colon, there is a limit to the length of the longitudinal incision. In an organ so free and movable as the small intestine, I see no reason why I could not unite the convex surface to an extent of five or six inches, or more, if this would be desirable. In fact, I see no other limit than that of the length of the mesentery, the time required for suturing, and the length of the wound. It is evident that the length of the longitudinal wound should not be unnecessarily great.

When there is no mesentery, and consequently only slight mobility, for folding in or apposition of the convex free surface of the intestine, or where the mobility is diminished or lost by diffuse inseparable adhesions, there is, of course, a limitation to the application of this principle.

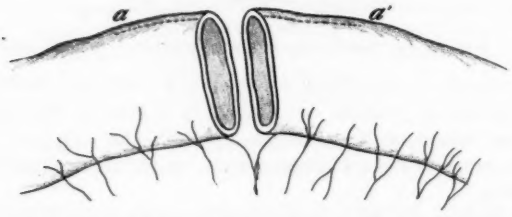
In one case of stenosis of the cæcum from tuberculosis, with remittent attacks of pain from incomplete occlusion, in which I did not deem

excision of the cæcum advisable, I made this plastic operation, uniting transversely an incision of about four centimetres in length. The operation gave partial relief only, and a fecal fistula resulted, which necessitated an ileo-colic anastomosis, which was followed by relief of the symptoms of the stenosis and left the fistula secreting mucus, as a rule, with, very rarely, some fecal matter.

Tension in the united wound and lack of free fecal passage at the place of operation are, when the sutures are applied correctly, undoubtedly the main cause of non-success—that is, of spontaneous reopening of the sutured intestine.

This plastic operation, when applied to resection and circular suture, will enable us to avoid narrowing of the intestine by folding in of its wall at the place of suture (Fig. 1). If, for the sake of additional safety,

FIG. 1.



it is deemed desirable to apply a second row of sero-muscular sutures at a distance of one-half centimetre from the first row, the advantage of having a larger amount of serous surface in contact is counterbalanced by the increase in size of the circular fold. The narrowing effect of a large fold can be overcome entirely by the plastic operation, because we can make the longitudinal division long enough to secure a circumference of any size desired.

The same principle is applicable when we wish to unite an intestine of small calibre end-to-end with one of large calibre. By longitudinal division of the smaller intestinal tube the line of union is easily made to correspond to that of the larger tube. If the lumen of the larger intestine is not deemed sufficiently wide to permit of so much folding in as is required, a longitudinal division is also here resorted to, until at last as large a line of union as we deem desirable is secured.

In artificial anus, whether this be the result of a premeditated operation or of an accident, where the mucosa of the intestine is finally united to the skin, it is commonly observed that the so-called spur forms a more or less complete obstruction to fecal passage from the proximal into the distal portion of the intestine. The spur, so to speak, leads the bowel-contents from the bowel out through the opening in the skin. The distal portion becomes small and retracted from non-use.

The spur is formed by a semicircular fold or group of folds located opposite to the opening through the abdominal wall at the place of the bend of the opened intestine. This semicircular fold may increase so as to extend entirely around the lumen of the intestine, thus becoming a circular fold, and is then located at the end of the proximal portion of the intestine close to the opening in the skin, through which it may protrude as a prolapse of the mucosa or wall of the proximal bowel. When this spur is well developed it may form, even when the intestine is loosened from the abdominal wall, an impediment to free fecal passage that frustrates simple transverse or longitudinal suture of the intestinal opening, and consequently necessitates resection of the loop containing the spur.

As resection with subsequent circular suture is as yet an operation of some gravity, it would be an advantage to avoid resection and still overcome the stenosis and the influence of the spur with a more simple operation. That this can be done by application of the principle of the transverse union of a longitudinal wound I propose to show by the following case:

A. T., male, aged fourteen years, an American of German descent, entered the German-American Hospital, for operation, in my service, on April 2, 1898.

Family history. Father, mother, brothers, and two sisters living and healthy. One sister died of perityphlitic abscess. Grandparents, uncles, and aunts living and healthy, or cause of death unknown. Paternal grandfather died in old age of diphtheria. One paternal cousin had operation for appendicitis in 1894.

The patient's personal history was negative as regards disease or injury.

Present illness. On the evening of March 22, 1897, the patient was seized with acute pain in the abdomen below the level of the umbilicus; the pain was generalized, very severe from the first, and of a severe aching, griping character, and was accompanied by vomiting and diarrhœa. He had elevation of temperature, but no chill until the following day. The pain lasted throughout the night, but in the morning it was not so severe and the patient walked about outdoors. At noon he had a chill and went to bed. Nausea and slight diarrhœa were present. Severe abdominal pain in the lower half of the abdomen came on at two o'clock the next morning and continued with remissions for two weeks, accompanied by daily elevation of temperature.

A physician was called on March 24th, who made a diagnosis of appendicitis. On April 5th the perityphlitic abscess was opened in narcosis. Fecal matter, with pus, escaped from around the appendix at the time of operation.

From this time until April 2, 1898, when I operated, a fecal fistula had existed, which has discharged a varying amount of feces daily. For the first eight weeks after the operation from one-fourth to one-eighth of the feces passed through the fistula and the remainder by the rectum. The rectal discharges were normal in color and occurred once daily. At the end of eight weeks the fecal discharge through the

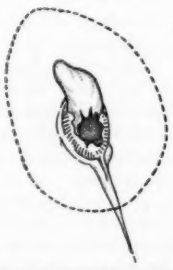
fistula decreased rapidly, so that it amounted only to a moistening of the dressings three times a day with fecal matter. About this time the wound was explored for gauze, which was supposed to have gotten into the intestine. After this exploration there was an immediate increase in the amount of fecal discharge through the fistula, which continued up to the time of operation. He has usually had about four to six evacuations daily through the fistula, varying from a drachm to three ounces, but ordinarily about one ounce. The feces were of normal color and soft, but not liquid. The amount of feces passed per rectum appears to be about the same as before the fistula was formed; the character is normal; the bowels are regular and there is no tendency to diarrhœa.

Relief from pain immediately followed the opening of the perityphlitic abscess and he has felt well ever since, with the exception of a few hours after the operation.

Operation, April 2, 1898. After the usual preparation, liquid diet and irrigation of the bowels through the fistula in another room, without using a rubber tube to push the spur back or down, he was brought to the operating-room. When he was put upon the table feces welled out. There were present at the operation the doctors from the Polyclinic. Drs. Haiselden and Buford assisted, and Dr. Gottschalk administered the ether.

The fistula was located in the right inguinal region, an inch to an inch and a half from Poupart's ligament, or from the anterior superior spine of the ilium. The opening was six centimetres in circumference, two centimetres in diameter, and would admit the little finger. The mucosa of the intestine was united to the skin, that is, the fistula was labiate. The mucosa bled when the finger was introduced. A tongue-shaped flap of mucosa, one centimetre square, protrudes when he strains. It comes out of the upper, outer corner of the fistula, and can be easily replaced. The fistula is surrounded by excoriated skin for an inch or more (Fig. 2).

FIG. 2.



Prolapse of tongue-shaped mucosa. Opening passable for the little finger. Dotted line indicates incision for cutaneous flap.

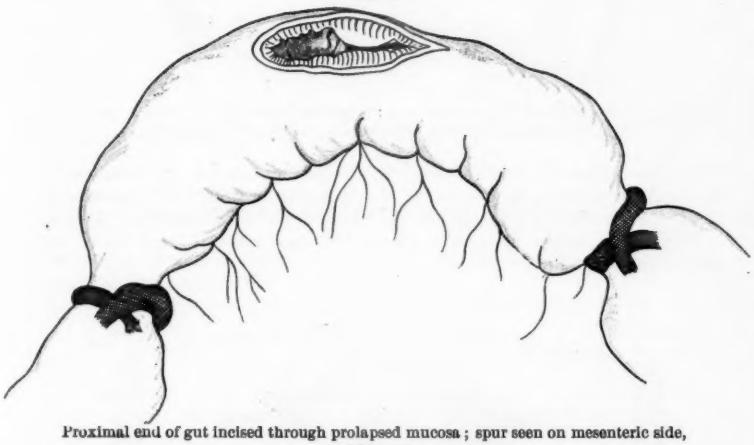
The fistula was now circumcised, one centimetre and a half from its border, through the skin, subcutaneous tissue, and abdominal muscles, down to the transversalis fascia (Fig. 2). This circular flap, like a collar, was loosened and closed tightly by a continuous silk suture so that none of the intestinal contents could pass out.

The abdomen was then disinfected and clean covers put on the table and the patient.

I now opened the peritoneal cavity one inch medial to and above the fistula, using great care to avoid adherent intestine. The omentum met with at first was ligated in portions. The isolation of the loop with the fistula was relatively easy. It was found to be a loop of small intestine, and was surrounded by gauze sponges, freed from adherent omentum and held aside out of the abdominal wound while search was being made for the cæcum and appendix. The wound was packed with several sponges, the parietal peritoneum united to the skin, the branches of the inferior epigastric artery ligated, and the incision prolonged up and down in the sheath of the rectus muscle.

The cæcum was found to be free from adhesions and the appendix was adherent to the cæcum. The end of the appendix was dilated, fluctuating, and contained a fecal concretion.

FIG. 3.



Proximal end of gut incised through prolapsed mucosa; spur seen on mesenteric side, within gut.

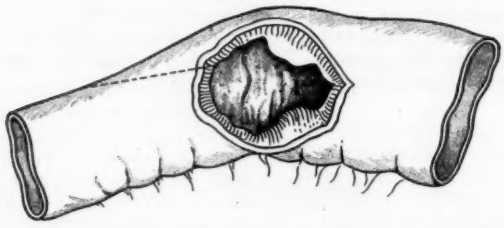
The appendix was amputated and the stump buried under a musculoserous circular flap.

I now proceeded to operate on the fecal fistula, which was found to be located two feet above the cæcum. The loop of the ileum containing the fistula was pulled well out of the wound and surrounded by gauze. The loop was emptied and ligated by means of gauze strips, two to three inches on each side of the fistula (Fig. 3). The adherent omentum was dissected off from the intestine, which necessitated only a few ligatures. The abdominal-wall flap was then cut off from the border of the fistula.

The fistula appeared as a round or oval opening one-half to an inch in diameter on the convex surface of the ileum, half to three-quarters of an inch from the mesenteric border on each side (Fig. 3). The tongue-shaped flap of mucosa was found to be part of a circular fold hanging down from the proximal border of the fistula, continuous with the spur, and forming with this a circular prolapsed and invaginated valve or flap.

It was evident that a simple union of the fistulous opening either in a transverse or longitudinal direction would not do away with the stenosis caused by this ring-shaped valve of the mucosa, and consequently would not remove the impediment to the passage of feces at this point, because this ring of mucosa would protrude into the lumen of the intestine and perhaps be the beginning of an invagination, or would at times at least impede fecal circulation.

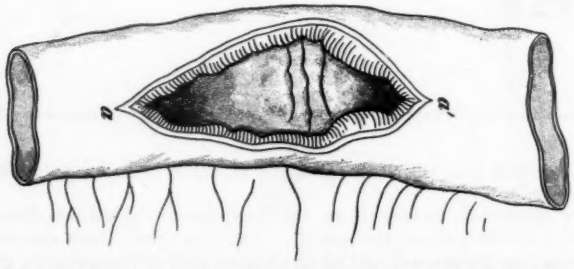
FIG. 4.



Wound in ileum held out, showing spur, viz.: A counter fold or group of folds of mucosa. Line of incision 1 inch down into distal (smaller) portion of ileum.

I believe that the spur or circular valve, by causing a disturbance of fecal circulation, is the cause of the common failure of permanent closure of the fistula following simple suturing of the intestinal opening. The fistula reappears in a week or two and reopens because of the spur which remains.

FIG. 5.



The whole of incision, viz.: the longitudinal wound in the ileum at middle of convex (opposite to mesentery) border. 1 inch up, 1 inch down; width of fistula ½ inch — 2½ inch. a lower and a' upper corner to be united by a guide suture left long.

I therefore decided to overcome the effect of the spur by the following plastic operation on the intestine:

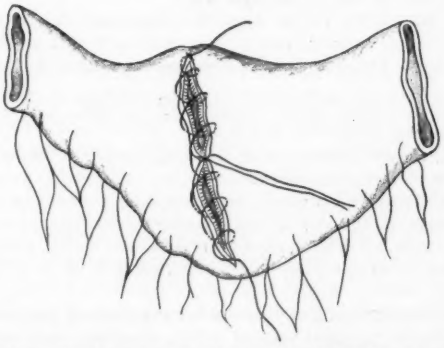
1. A longitudinal incision at the convex border of the intestine one inch in length in the proximal end of the intestine through the tongue-shaped valve, up into the normal intestinal wall above it (Fig. 3).

2. A longitudinal incision, one inch long, into the distal or narrower portion of the intestine below the spur, thus making a longitudinal wound two inches in length on the convex border of the intestine

(Fig. 4). As the original fistulous opening was two centimetres in diameter, the wound would be about three inches in total length. Upon making the incision at the upper end of the wound I saw a Peyer's patch.

The spur formed a circular valve of two or three parallel folds of mucosa, half an inch broad, most pronounced on the mesenteric side,

FIG. 6.

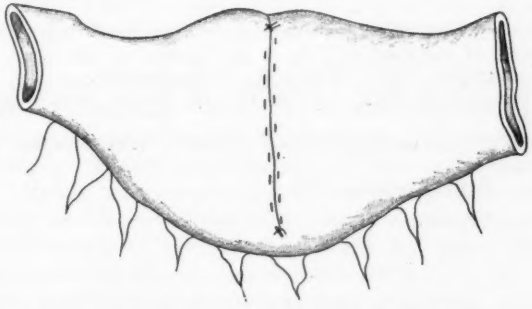


Continuous suture. Lies through whole thickness of wall, aided by the guide suture.

extending around the entire circumference of the intestine, but smaller on the convex border (Fig. 5).

3. Transverse union of this longitudinal wound (Fig. 6).

FIG. 7.



Sero-muscularis continuous suture to bury the preceding suture.

a. Suture *a*–*a'* (Fig. 5) united the upper and lower corners and was left long for traction, dividing the wound into two transverse halves with the suture in the middle.

b. A continuous silk suture through all the layers of the intestine (Fig. 6).

c. A continuous serosa-muscularis suture, one centimetre outside of the former.

d. A second continuous serosa-muscularis suture to bury the former (Fig. 7).

4. Disinfection of the sutured loop with 1 : 1000 sublimate solution, and removal of the gauze ligatures around the loop of intestine.

5. Removal of the sponges and examination of the abdomen for hemorrhage.

6. Step sutures of the abdominal wall.

7. Gauze drain down to the appendix and over to the sutured loop of the ileum.

8. Injection of two quarts of physiological saline solution into the rectum.

The operation lasted three hours and a half. At its close the patient's pulse was good; no shock.

7.30 P.M. Gaseous distention of the abdomen. A little gas escaped after insertion of the rectal tube.

April 3d. Patient had a small dark-green and very thin bowel movement. Throughout the day he had considerable trouble on account of gaseous distention, for which injections of warm water and peppermint were made, but little gas passed. Temperature 97.4° to 100.2°. Pulse 120 to 130.

4th. A small amount of gas passed after injection of peppermint water. During the day he vomited several times, dressings were changed, half an ounce of bloody fluid, with some bright yellow pus, followed the removal of the packing. A drainage-tube was introduced. Temperature 98.4° to 100°. Pulse 100 to 108. During the day he had two small bowel movements.

5th. He passed considerable gas and had two dark green, thin bowel movements. Temperature, 99.2°. Pulse, 90.

6th. Slept well last night. Temperature 99.6°. Pulse 76. The drainage-tube was removed, half an inch cut off, and reinserted. Dressings were dry.

7th. Temperature 99.6°. Pulse 66. A large bowel movement followed the use of enemata.

8th. Temperature 99.4°. Pulse 56. Tube removed.

11th. Temperature 98.4°. Pulse 68. He has no pain. Eats and sleeps well.

24th. Only a granulating surface remains. The function of the bowels is normal.

October. Patient remains well.

269 La Salle Avenue.

CRITICAL SUMMARY OF RECENT LITERATURE

ON THE

TREATMENT OF ABSCESS OF THE BRAIN.

By Joseph Collins, M.D.,
OF NEW YORK.

Viewed from a therapeutic stand-point, abscess is by all means the most important disease to which the brain is liable. Its causation is well known; its pathogeny is clearly understood; its treatment calls for one measure, viz., prompt surgical interference. A few years ago the hopelessness of cases of brain abscess was appalling. To-day surgical treatment offers a far greater prospect of cure than in any other intracranial lesion. The inevitable course of abscess in the brain being to death, which medical treatment has no influence to delay, it behooves us to recognize the gravity of the condition, and when face to face with the indications of such disease to utilize early and vigorously the only means in our power to cope with it. That this statement is entirely true no one will be likely to deny. Despite the recognition of its truthfulness, and the wide-spread acceptance of it, the literary records of each succeeding year show that the mortality rate of abscess of the brain has not fallen as it should have done. This result may be attributed to two factors: First, to lack of early recognition of the disease, apart from its localization; and, second, to the fact that surgeons are oftentimes not sufficiently assiduous in their search for it. That the mortality-rate of abscess of the brain is not so great to-day as it was several years ago is due not alone to the fuller comprehension of its amenability to surgical treatment, but to an understanding of the relationship existing between it and certain preventable and curable diseases to which it is secondary. Thus, the requirements of modern surgery are such that wounds of the soft and hard parts of the head are maintained aseptic. Therefore, this causation of brain abscess (and it will not be forgotten that, according to the statistics of some, nearly one-half of all the cases are of this origin) has succumbed, in a measure, to the advancement of medical science. The fact that a third of all cases of intracranial abscess are secondary to otitic and rhinitic diseases which are amenable to treatment is generally recognized, but not generally heeded. Certain it is that the general practitioner is not sufficiently insistent upon examination of the ear after the occurrence of infectious disease, and not sufficiently persistent in the treatment of otitis media when it is found. The other sources of brain abscess, viz., the metastatic, are not so submissive to prophylactic treatment. Therefore, they continue to occur with about the same frequency as before.

An examination of the literature of the past year shows that physicians are recording their examples of failure and success in the treatment of brain abscess in an encouraging way. It is proposed to make a brief review of the more important of these cases, and, if possible, to point a moral.

Saenger[1] records the case of a man, twenty-eight years old, who, one year before coming under observation, had double otitis media. Six months later the right malleus and incus were extracted. After a month he was complaining of continuous pain in the forehead, alleviated by antipyrine, ice-bags, and aural irrigation. A few months later he complained of headache, vertigo, vomiting, and stupidity. Examination showed defective innervation of the left side of the face and slight left hemiparesis. The reflexes were somewhat exaggerated on the left side of the body. Sensibility of the left arm and forearm was diminished, especially the pain-sense. Ophthalmoscopic examination revealed bitemporal paleness of the optic disks. The pulse-rate was about 50, and the temperature was normal. Percussion of the right side of the forehead and the right temporal region caused great pain. It was finally decided that there was left homonymous hemianopsia, which, in connection with the symptoms, pointed to abscess in the posterior pole of the right hemisphere. The patient's skull was trephined over the indicated area and a hollow needle thrust into the brain in different directions, but no pus was found. The patient died seven days later, and on autopsy an abscess was discovered in the right occipital lobe. Here, then, is a case of abscess of the brain in which the symptoms pointed decidedly to intramedullary involvement of the right occipital lobe, with slight encroachment by the surrounding encephalitis on the parietal convolution. The occurrence of left homonymous hemianopsia pointed unequivocally to this. The case teaches that when the diagnosis is reasonably sure, and there are coexisting symptoms pointing to its location, the surgeon should be asked to make greater exploration than that possible through a small trephine opening. The unmolested case terminates in death, and nothing is to be lost from making most extensive exploration. It teaches, moreover, that in a case in which the symptoms of brain abscess had existed for such a long time the opening of the skull should not be so delayed as it was here.

Steiner[2] reports the case of a young man of inherited and personal tuberculous history who developed suddenly lameness of the right hand. The next day he had severe headache, general weakness, and right hemiparesis, including the face, especially the angle of the mouth. Examination showed exaggeration of both patellar reflexes, with right side foot-clonus. The pulse-beat was irregular, varying from 60 to 70

[1] Neurologisches Centralblatt, 1898, p. 768.

[2] Ibid., p. 1070.

per minute, and the temperature was slightly elevated. Diagnosis: cerebral embolism of classical location. There then followed gradual retrocession of the symptoms, so that a month later they had almost entirely disappeared. A few weeks later he complained of headache, and after a few days he was found dead in bed. The autopsy revealed a large cavity occupying the entire posterior third of the left hemisphere, partially filled with clear, thin fluid containing pus. In the right lung there was a purulent focus about the size of a cherry. The necessity of careful and repeated examinations, even when the symptoms are not suggestive, is very clearly shown by this experience. It is highly probable that the diagnosis of abscess could not have been made, even though homonymous hemianopsia, which must have been present, had been detected. The case further teaches that the pulmonary origin of cerebral abscess should be constantly kept in mind and carefully searched for. The same writer reports a second case, which is no less interesting. The patient, a woman, aged fifty years, had complained for two years of severe headache, which followed a fall on the back of the head. Two weeks later there was left hemiparesis, inclusive of the left angle of the mouth. She complained of a swishing, ticking sound in the right ear, of headache, which was more severe on the right side than on the left, and of occasional vomiting. The top of the head, the back of the neck, and the spinous processes of the interscapular space were sensitive to pressure. A diagnosis of brain abscess in the vicinity of the internal capsule plus superimposed hysteria was made, although on what grounds is not apparent from the history. The patient improved rapidly. Three months later she was readmitted to the hospital on account of fracture of the thigh. A fortnight after this there were severe headache and vomiting. The left upper extremity was in a condition of flexion-contracture. The patient got steadily worse, and died in a condition of stupor two months after readmission. Double optic neuritis was made out some time before death. There was no fever, but during the last days the pulse was very rapid. An autopsy revealed a large, pasty, broken-down mass in the posterior third of the right hemisphere, in the centre of which was a round, brownish-red conglomeration, containing pus. A third case reported by this writer is that of a man, aged thirty-two years, who had complained for about six weeks of pain and difficulty of hearing in the left ear. There was no history of discharge from the ear. Paracentesis of the drum ameliorated the pain. A month later the patient complained of severe right-side headache, followed by dizziness, vomiting, and progressive mental obscuration. Lumbar puncture was made, but without result. Two weeks later there were nystagmus, left convergent strabismus, unequal pupils, the left being larger than the right, and left hemiparesis. A fortnight later the patient died suddenly.

Autopsy revealed an abscess involving the entire left cerebellar hemisphere, apparently secondary to thrombus in the left transverse sinus and a carious condition of the petrous portion of the left temporal bone. In this case the existence of abscess was apparently not suspected. It would seem from the history of middle-ear involvement and from the development and association of the symptoms that cerebellar implication could be the only hypothesis to explain the patient's condition. Considering the complications in this case, it is very difficult to say what the outcome would have been, even though operation had been undertaken early, but this is a type of case in which surgical exploration is not only justified but demanded.

Von Celli[1] has reported a case of brain abscess in which otitis media attended by spontaneous perforation followed an attack of influenza. The patient had symptoms of a mild infection without particular nervous phenomena. Death occurred suddenly, without apparent cause. The autopsy showed active suppuration in the mastoid cells; intimate adhesion of the membranes over the temporal lobe to the petrous portion of the temporal bone, and a full abscess in the inferior temporal gyrus. Although very incompletely reported, this case may be utilized to show that the symptoms of cerebral abscess are sometimes so inconspicuous that the existence of the disease can only be guessed at from the association of apparently trivial symptoms with suppuration of the middle ear. Recitation of it emphasizes the necessity of treating inflammations of the middle ear following such a simple disease as influenza with the same care and determination bestowed on far graver conditions. In the same *Bulletin* (page 450) Balliet records an example of abscess of the cerebellum consecutive to suppuration of the middle ear, occurring in a man aged thirty-six years. The symptoms suggested abscess of the cerebellum, and operation was undertaken to reach it, but with negative results. On autopsy it was found that the abscess occupied the entire central portion of the left cerebellar hemisphere. The abscess-cavity was not found, because the trephine opening was not large enough to allow sufficient exploration, which may be taken to show that when the symptoms of abscess are so pathognomonic as they were in this case no limit should be put upon the amount of exploration necessary to its discovery. Operation is the patient's only hope, and the fact that the abscess is not discovered by one trephine opening should not be taken to indicate that several others or even extensive resection of the skull-cap should not be made.

Balas and Cade[2] have reported a case of abscess of the brain with phlebitis of the right lateral sinus of otitic origin, which may be taken as a type of the case that should at the present day be amenable to

[1] Bulletin de la Société Anatom. de Paris, 1897, p. 333. [2] Lyon Médical, March 20, 1898.

surgery. The patient developed, after an acute purulent otitis media, mastoid pain followed by grave cerebral phenomena indicative of intracranial inflammation. The mastoid was opened, but without amelioration of the symptoms. Two days later a trephine opening was made over the temporal lobe, but without immediate results. Three days afterward there was an issue of pus through this opening, followed by temporary amelioration of the symptoms. The report of the case does not show why the trephine opening was not enlarged at this time and the brain substance incised until the pus-cavity was reached. The patient died a few days later, and on autopsy an abscess was found just below the level of the trephine opening.

McKernon[1] reports a series of three cases of intracranial abscess, two of which are of interest in this connection.

A girl, aged seventeen years, had suffered for eleven years with intermittent discharge from both ears, and for four years with violent occipital headaches. Just previous to coming under observation the discharge and headache had become more severe. Temperature and pulse were somewhat elevated. There was absence of the right drum membrane except a small portion in the posterior superior quadrant, which was bulging. There was a large amount of granulation tissue, covered with gray-colored muco-pus. The upper third of the right mastoid was slightly tender. The patient continued to grow worse. Operation: Opening the mastoid revealed nothing abnormal save the remains of a condensing mastoiditis and a few drops of pus in the antrum. After the operation the patient complained of unbearable headache, restlessness, and sleeplessness. The temperature ranged from 99° F. to 102° F. There was no optic neuritis. A second operation was done and the sinus curetted. During the operation it was noted that the posterior dural wall of the lower half of the sinus was thickened and slightly bulging. The next day the dura over this point was opened and a grooved director introduced downward and backward for about two inches. On withdrawing it there was a discharge of an ounce of foul-smelling pus. When the opening was enlarged more pus discharged. The patient died a few hours after the last operation. In this case the existence of abscess of the brain was probably not suspected, it being come upon accidentally, for otherwise a different route would have been taken to reach it.

A second case reported by this writer was that of a young man who had had for some years intermittent discharge from the ears, usually associated with attacks of pain. Two weeks before admission to the hospital one of these attacks had occurred. The pain ceased, when a thin, white discharge made its appearance. The discharge stopped

[1] Archives o Otology, 1898, vol. xxvii. No. 3.

after a few days, and the pain recurred with renewed violence. The pain continued to grow worse, and on examination there was found a scanty discharge of gray pus from the right ear and a greenish discharge from the left ear. No mastoid tenderness. Examination of the urine showed that the patient was suffering from nephritis. When the mastoid was opened it was seen that the cells were all broken down, pus flowing freely from one to the other. The cavity was scraped and packed. The next day the patient continued to complain of violent pain in the wound and in the back of the head. The lateral sinus was exposed and opened from end to end, and a quantity of pus, clotted blood, and granulation tissue evacuated. The dura of the posterior sinal wall remaining tense, an opening was made through it, and a director carried into the cerebellum. When it was withdrawn there was an oozing of foul-smelling pus. The opening was then enlarged with the finger, and about two ounces of pus escaped. The next day he died of uræmic coma. The outlook in this case would seem to have been favorable, despite the extensiveness of the suppurative process, had it not been for the existence of a condition that is extremely intolerant of the depreciation of vitality attending surgical operation of any kind.

Marie and Sainton[1] have recorded a case of abscess of the left temporal lobe. In addition to being an important contribution to the study of aphasia, the history and outcome of the case show the urgent necessity for early and extensive surgical interference. The patient was a man, aged forty-seven years, whose first symptoms of cerebral abscess occurred in October, 1897. Although there had been no discharge from the ears, disease of the middle ear was found. The patient died four weeks after the first symptoms of cerebral abscess. The general symptoms and the aphasic symptoms pointed to abscess in the posterior portion of the supertemporal and midtemporal convolutions, cutting off the auditory from the visual centre. An operation was undertaken, but only a small opening was made and the abscess was not found. Examination after death revealed an encapsulated abscess the size of a small egg, situated in the position diagnosticated during life, and surrounded by a considerable area of non-purulent encephalitis. It was apparent that if the operation had been undertaken earlier and the surgeon had been fearless in the exploration the patient would have been saved. The authors, in concluding their paper, lay great stress upon these facts.

A case in which the outcome of operation was most satisfactory is recorded by Roper.[2] A boy, aged fourteen years, had had for upward of two years a discharge from the left ear. Latterly the discharge had become fetid, and the patient complained of severe pains in the left ear and side of the head. The pain seemed to be liable to paroxysmal

[1] Revue Neurologique, 1898, p. 198.

[2] Lancet, February 26, 1898.

increase, and after a few days it was attended with loss of memory for words, slow pulse, slight rise of temperature, vomiting, loss of power in the right arm, and double optic neuritis. There was no mastoid tenderness. The left temporosphenoidal region was explored and an abscess found. The arm recovered its power at once, showing that its impairment was dependent upon an œdematous condition of the motor area. The patient's memory gradually became restored, and eventually he made a complete recovery.

A case very similar to this except in its outcome is that reported by Paquet.[1] The patient was a child, aged five years, who developed slight œdema of the right side of the face and head, without apparent cause, save an otitis which was consecutive to an attack of measles three years before. Five days after swelling of the face the patient was taken with rigors, followed by headache and vomiting. The symptoms were thought to indicate mastoid involvement, and the mastoid was trephined, but without result. A few days later the patient died in coma. The autopsy revealed an abscess in the second right temporal convolution, which apparently was consecutive to thrombus of the lateral sinus. Why the lateral sinus was not explored when such positive indication of its infectious involvement occurred as in this case it is not easy to conjecture. When abscess of the brain is secondary to infection of a sinus it can scarcely be suspected even unless some area of the brain to which is allocated special function is involved. As the second temporal convolution of the right side is a "silent" area, no symptoms were present in this case.

Dench[2] records a case of temporosphenoidal abscess sequential to chronic purulent otitis. The patient had complained of intense headache, especially of the left temporal region. Just before coming under observation the pain was very severe. Apparently abscess of the brain was not suspected, for the mastoid antrum was opened and a considerable amount of cholesteatomatous material removed from the tympanic vault. Twenty-four hours after the operation symptoms of aphasia appeared. The middle cranial fossa was then opened just above the external auditory canal, the meninges reflected, and the temporal lobe explored by an aspirating needle. Pus and broken-down tissue having been found, the temporal lobe was freely incised. This revealed a large abscess-cavity, which was drained. The patient died four days later from suppurating meningitis, which was well developed before the second operation was undertaken.

It is not at all improbable that if operation had been undertaken before secondary infection of the meninges the outcome would have

[1] Le Nord Médical, April 1, 1898.
[2] Transactions American Otological Society, 1898.

been different. The abscess-cavity was so completely emptied and drained that there would seem to have been no reason why the patient should not have recovered.

Holt[1] has reported five cases of abscess of the brain in infants, and published a summary of twenty-seven cases in infants and very young children. He calls attention to the fact that abscess of the brain is rare in children under five years, and emphasizes the remarkability of this, considering that the two most potent causes of abscess—traumatism and otitis—are both very frequent during the first five years of life. The explanation of the apparent discrepancy between cause and effect is no doubt to be found in the fact that (1) although middle-ear disease is common before the fifth year, it is not frequently met with in young infants, and the time elapsing between its occurrence and the appearance of brain abscess is so protracted that it brings the patient beyond the fifth year; and (2) many cases of brain abscess occurring before the fifth year are not recognized. In young children the symptoms are much less pathognomonic. Unfortunately, they are at all times rather obscure, the patient not having the understanding to make complaint of pain and its character, and they are often mustered under the diagnosis of "meningitis" or "brain fever." Moreover, Holt's search of the literature is not complete, for I have found, without particular investigation, the report of a case by Ribbert[2] of a twelve-day old child in which autopsy revealed that both hemispheres were percolated with small abscesses. This writer refers also to a case reported by Zenkner and Wagner. It may therefore be said that, although abscess of the brain is more uncommon before the fifth year than during the latter half of the first decennium, it is not so uncommon as might be inferred from an examination of some of the older writers quoted by Holt, such as Meyer and Wyss. In the first case reported by Holt—a child, six weeks old—neither the history nor the symptoms suggested abscess of the left parietal lobe, which was revealed by post-mortem examination. Although there had been no discharge from the ears, thin, yellowish pus was found in both middle ears after death, so it seems probable that the brain was infected from the ears. The second case—a child, three months old—had symptoms such as constant fever (which during the last week was high); irregularity of respiration, cervical opisthotonos, and transient slight manifestations of nystagmus, rigidity, retraction of the abdomen, and vomiting, which led to the diagnosis of an irregular type of meningitis. Autopsy showed an abscess-cavity of the right parietal lobe, communicating freely with the right lateral ventricles. Both lateral ventricles, as well as the

[1] Archives of Pediatrics, 1898.

[2] Berliner klinische Wochenschrift, 1879, p. 617.

third and fourth, were filled with pus. The inferior surface of the cerebellum was softened and infiltrated with pus. Pus was found in the left internal auditory canal. The third patient was a child of five months, in which superficial abscess of the cerebellum was associated with diffuse purulent meningitis. Three days after a fall on the head the child began to emit piercing shrieks and to vomit. He lost flesh steadily, and had frequent attacks of muscular twitching, but no convulsions. The temperature was continually elevated, the pulse small and feeble; the neck retracted; there seemed to be no vision. The fourth patient was a child nine months old, whose symptoms seemed to be alternating psychical and motor irritability, drowsiness, cervical opisthotonos, tense bulging fontanelle, dilatation of the pupils, irregular respiration and temperature, a discharging right ear, rigidity of the four extremities, marked vasomotor symptoms, and optic-nerve atrophy. The case was regarded as one of basilar tumor or tuberculous meningitis. Autopsy showed one large and two small abscesses of the cerebellum. The fifth case can scarcely be called one of abscess, as the lesion was a suppurative ependymitis, acute pyocephalus.

Other cases of abscess of the brain, to which particular reference will not be made, have been recorded during the year by Grunert,[1] Poli,[2] Thomas and Lartail,[3] and by Vernazza.[4]

Thus it will be seen that a brief retrospect of the more important literature on brain abscess for the past year shows a deplorable mortality. The most potent factor in contributing to this frightful mortality is the failure to recognize the existence of abscess of the brain before it has produced either septic complications or profound exhaustion. Surgical technic has apparently very little, if anything, to do with it. The mortality-rate of brain abscess will drop just in proportion to the earliness of recognition and the courage of the physican in directing the surgeon to seek for it, even though there be no exact localizing symptoms. Abscess of the brain secondary to middle-ear disease is located in the vast majority of cases either in the temporal lobe or in the cerebellar hemisphere of the same side. When one is reasonably sure of the existence of brain abscess, no hesitation should be had in exploring first one of these regions, and then, if it is not found, the other. Delaying the operation until the appearance of unequivocal localizing symptoms, or procrastinating by operating on the mastoid after symptoms of brain abscess are evident, when one is reasonably assured that abscess exists, is a far greater injustice to the patient than subjecting him to an exploratory trephining.

[1] Münchener med. Wochenschrift, 1898, p. 245.

[2] Arch. it. d'Otol., Rinol. e Laringologia, vol. vii. fasc. 1. January, 1898. La Clinica Medica Italiana, July, 1898.

[3] Rev. hebd. de Laryng., Otol. et Rhin., February 26, 1898.

[4] Boll. delle mal. dell' orech. della gola e del naso. 8, 1898.

REVIEWS.

A System of Medicine by Many Writers. Edited by Thomas Clifford Allbutt, M.A., M.D., LL.D., F.R.C.P., F.R.S., F.L.S., F.S.A.; Regius Professor of Physic in the University of Cambridge; Fellow of Gonville and Caius College. Vol. vi. London and New York: The Macmillan Company, 1898.

A review of the parts of such a comprehensive work as that of which this forms the sixth volume is difficult from the fact that so much is to be said that any article that would represent the contents at all adequately could not be condensed within the limits of the ordinary Journal review. It is only possible, therefore, to call attention to certain scattered points. The present volume contains articles upon the diseases of the respiratory system, some of the articles upon the cardio-vascular system, and the diseases of the blood. It differs from the ordinary arrangement of such works, partly from the placing of the blood diseases under the heading of the circulatory system, partly also from the interposition of three important and very valuable articles upon intrapleural tension, cardiac physics, and dropsy. The advantage of the former feature seems to the reviewer to be very doubtful. As an argument against such an arrangement may be mentioned the fact that scurvy is properly considered in close connection with the purpuras and with hæmophilia, yet scurvy cannot be considered a disease purely of the circulatory system, or even of the blood, to any greater extent than could rhachitis or gout. However, this is but a small question, and the matter in the articles is good, no matter where they be placed.

As with previous volumes, much value is added by the carefully selected and arranged bibliography at the end of each article. Moreover, the references are made much more useful by the sensible alphabetical arrangement according to the author's names, making the finding of the reference an easy matter, instead of a labor in itself, as is the case in one of our best encyclopædic works of reference, where, for no obvious reason, the enumeration of authorities is made in such a higgledy-piggledy manner that often the whole and unnecessarily long list of references has to be scanned in order to find the one desired.

The first two articles are by William Ewart, and deal with diseases of the bronchi. The classification of the various forms of bronchitis is the one that is of most clinical value. With others, he believes it difficult to draw a hard-and-fast line between capillary bronchitis and broncho-pneumonia, but gives it as his opinion that the former term should be retained. He says that while the casts of plastic bronchitis may consist largely of mucus, they are "mainly fibrinous, and owe to fibrin their characteristic consistence." This is opposed to recent views as to the formation of these casts, as especially studied by Grandy (*Centralblatt f. allgem. Path.*, viii. 13) and Habel (*Centralblatt f. innere*

Med, 1898, No. 1, p. 9.). In the matter of treatment of the various forms of bronchitis the author has a decided leaning toward the theoretically plausible method of intratracheal injections. It is a decided comfort to find so high an authority advocating the use of the much maligned poultice. The subject of bronchiectasis is thoroughly discussed, and an excellent summary of the various conflicting theories as to its physical causation is given, with a clear statement of the author's well-known view.

The important section upon pneumonia (croupous, catarrhal, and chronic) is written by P. H. Pye-Smith. A few points only can be touched upon in this review. The much-disputed origin of the crepitant râle is held to be the bubbling of air through moisture in the bronchioles. The occasional occurrence of a tympanitic or even cracked-pot sound, and of signs approaching those of pleural effusion, is mentioned, although these misleading sounds are but infrequently spoken of by writers on pneumonia. Nothing is said regarding the prognostic value of the presence or absence of leucocytosis, the statement being made, without qualification (p. 112), that the leucocytes are considerably increased. In regard to the nature of pneumonia, he concludes that the disease is due to a special form of inflammation of the lung, and differs in important particulars from the ordinary specific fevers. In thus stating his views the author takes a position opposed to that of many systematic writers, yet a careful reading of the section on the pathology of the disease (on page 114) cannot fail to impress all. It is disappointing, however, to find no explanation for the curious, sudden cessation of symptoms at the time of crisis, and to find no remarks upon the powerful effect of the toxins of the disease. While much of this question of toxin and antitoxin formation in pneumonia is as yet purely theoretical, it would have been of interest to read the author's views upon it. One other point that is noticeable is the absence of mention of so-called meningismus, which, at least in children, is so frequent a source of error in diagnosis. The value of digitalis in the treatment of pneumonia is held to be *nil* in his experience. However, to appreciate the author's view regarding digitalis the original should be read. Venesection in cases of overdistention of the right heart is urged as rational and useful. Appended to the section on croupous pneumonia there is an analysis of 434 cases of acute fibrinous pneumonia from private and hospital records.

Dr. Percy Kidd has written the article upon phthisis pulmonalis. Of the many striking features of this article but few can be selected for comment. In discussing diagnosis he makes the statement that the cracked-pot sound is not pathognomonic of cavity, as it may be obtained on percussing the normal chest of a crying child. The truth of this must be recognized by anyone accustomed to examining children, yet one seldom sees reference to its presence in those circumstances. One is surprised to find no mention of Eustace Smith's sign of enlarged tracheo-bronchial glands, although other evidences of that condition are fully discussed. The proportion of cases of phthisis wherein pneumothorax was found at autopsy (11 per cent.) seems very large. In speaking of the treatment of hæmoptysis he says, most truly: "Clinical experience shows that the effect of ergot is as uncertain and unsatisfactory as those of gallic acid and lead," and also that the application of ice to the chest is of but little use.

The article upon pneumoconiosis contains two sentences that mar an otherwise good article. It is stated that "when dust which has entered the respiratory system has reached the alveoli it attaches itself in the first place to the walls, but sooner or later penetrates them. The particles are borne along by mucous cells, which, being destitute of walls, envelop them after the fashion of amœbæ; but the foreign bodies soon prove a source of irritation, which in the case of the more irritant kind advances to inflammation of lower intensity, but sufficient to induce an outpour of some lymph and the generation of granular matter and exudation cells," and, there might then have been added, "and they all fell to playing catch as catch can till the gunpowder ran out of the heels of their boots." The "mucous cells" again get lost in the next sentence, for we read that "the mucous and inflammatory cells make their way along the adjoining connective tissue," etc.

Pulmonary aspergillosis is well discussed by H. D. Rolleston in an excellent review of our present scanty knowledge of the condition.

In the article upon emphysema, by J. R. Fowler, the subject is divided into two sections, dealing with large-lunged and small-lunged varieties—a division that has decided value on both clinical and pathological grounds. As in the article dealing with pneumonia the deceptive atypical physical signs are mentioned, so in the article upon pleurisy, by Dr. Samuel Gee, the occasional occurrence of bronchial breathing over pleural effusion is noted at some length. The various explanations of the presence of bronchial breathing over some pleural effusions are all unsatisfactory, Dr. Gee's explanation being that the transmission of the breath-sounds from the bronchi "depends not inversely upon the quantity of liquid effused, but directly upon the openness of the air-tubes; for liquid is a good conductor of sound." It seems to the reviewer that this explanation does not explain, and that the transmission of various sounds depends not so much upon the conductivity of the various media as upon the relation of the latter to each other and the various sound refractions (so to speak) that occur upon the transmission of vibrations from one medium to another. With the statement that ægophony is seldom heard there can be nothing but agreement, and it is often noticed with what disappointment the student hears that ægophony—one of the sounds that he seems always to expect to find—is absent in the vast majority of cases of pleurisy with effusion. In the section on treatment no mention is made of the value of sodium salicylate or of Hay's treatment—measures that surely deserve a place.

An excellent and appropriate article by Professor Michael Foster upon the general features of the blood deserves notice. It is, indeed, a valuable feature of the volume, being more physiological than the usual clinical article and more clinical than that found in works upon physiology.

Dr. S. Monckton Copeman has written a good article upon the clinical examination of the blood. His classification of the leucocytes is as follows:

(*a*) Oxyphil	{	coarsely granular. finely granular.
(*b*) Basophil	{	coarsely granular. finely granular.
(*c*) Hyaline	{	large. small.

It is, indeed, a pity that some uniform system of classification of the leucocytes cannot be agreed upon. Some simple and yet clinically expressive nomenclature is certainly desirable. It can hardly be granted that the above classification is entirely satisfactory.

In speaking of the estimation of hæmoglobin the apparatus of Dr. Oliver is recommended. The most serious fault in v. Fleischl's apparatus and the method of correcting it is not mentioned—the wide difference (10 per cent.) in the readings at the two sides of the reservoir, which can be obviated by interposing a paper in which a slit has been cut, which cuts off all light transmission except for a space corresponding to two or three degrees.

The article upon cardiac physics, by Professor Sherrington, is well worthy of careful reading. Its introduction into the volume is a decided gain. It is very satisfactory to find that the author considers cardiograms inconclusive. An intimate acquaintance with the cardiograph would seem to be necessary ere one could learn anything from its tracings or could properly weigh the conflicting interpretations of the integral parts of their frantic curves. Such an amount of experience with the instrument is not usually attained by the ordinary clinician.

An excellent introductory article upon the classification of the anæmias and one upon chlorosis are written by the editor. The various theories upon the causation of the latter receive careful attention, and are clearly expounded, while the clinical picture of the disease is delightfully portrayed. Pernicious anæmia is described by Dr. Sidney Coupland. He gives his adherence to the hæmolytic theory of its causation, as elaborated by Hunter.

The articles upon splenic anæmia, hæmophilia, hemorrhages in newborn children, purpura, scurvy, and hæmoglobinuria are all excellent.

Dr. Robert Muir's article upon leucocythæmia is extremely satisfactory. In regard to its causation he says: "In the absence of knowledge regarding the agent producing the excessive proliferation of leucocytes we cannot definitely assign the place of leucocythæmia in the category of disease. On the whole, it presents most points of analogy to the growth of tumors, the analogy being especially striking in the lymphatic variety; but, on the other hand, it is not absurd to suppose that it may prove to be due to a microparasite." Such a thought must have struck any one familiar with either the clinical or pathological aspects of the disease. The solution of the question must reasonably be expected to be forthcoming at some not far distant time, especially with accumulating experience of the acute forms.

Articles dealing with symptoms common to many diseases are shown to be of value by two in this volume. One of these is that upon purpura, by Stephen Mackenzie, the other, that upon dropsy, by W. Howship Dickinson. In both of these articles the subjects are excellently handled without duplicating the matter contained in the various sections dealing with the diseases of which they are but symptoms.

The remainder of the volume is concerned with a part of the subject of diseases of the heart. These require but little notice, as the names of the authors carry with them the assurance that their work results in articles destined to be classics. The article upon functional disorders of the heart, by the editor, should be read by every one, not only because of the useful, practical matter contained in it, but as a type of clearly written English seldom found in medical writings.

The volume that forms the subject of this review bears out the promise of its predecessors, that the *System of Medicine by Many Authors* will rank with Ziemssen's, Reynolds', and Nothnagel's encyclopædic systems as standard works of reference for very many years. F. A. P.

RENAL GROWTHS: THEIR PATHOLOGY, DIAGNOSIS, AND TREATMENT. By T. N. KELYNACK, M.D. (Vict.), M.R.C.P. (Lond.). Edinburgh and London: Young J. Pentland. New York: The Macmillan Company.

THE fact that no systematic treatise on growths of the kidney was to be found in the English language caused Kelynack to attempt to supply what he justly calls "a want." The author calls attention to the uncertainty and confusion of our knowledge regarding kidney growths, to the obscurity of their pathology, and to the scant attention given to the origin, character, and relationship of renal neoplasms, a custom which until very recently was the fixed habit of writers, observers, and teachers.

It is quite true that numerous cases have been put on record, but many of the reports are almost or quite valueless because of a hap-hazard, improper, and confused nomenclature. Some of the descriptions are entirely misleading, and there has been an accumulation of what Junius called "false facts." Most growths, says Kelynack, have not been molested, but have been allowed to run their course, because surgery in the past has not been very successful. It is obviously urgently necessary to have a scientific basis for practice—"clinical progress halts for an advance in pathology." This book seeks to furnish, and does furnish, a greatly needed advance in pathology, and we find in it a study and comparison of all recorded cases, the erroneous and misleading reports being pointed out and the reliable ones being indicated and analyzed. The author draws many valuable clinical deductions from pathological observations, and essays to place the treatment on a scientific basis. The book contains numerous excellent cuts and also a most thorough and valuable bibliography.

The commonly accepted nomenclature of renal growths is, with justice, strongly condemned by the author. He shows that almost inextricable confusion has arisen from "the use and misuse of terms." Most malignant tumors have been called "cancers," many have been designated "encephaloid growths;" others have been recorded as instances of "fungus hæmatoides." In a majority of the older cases no microscopic study was made. Reports are reliable only when founded on a microscopic study, and "it is only within the last few years that renal carcinomata and sarcomata have been differentiated." In many reports there is no distinction made between primary and secondary growths.

Kelynack protests against a not unusual custom of placing enlargements of the kidney due to inflammation or a mechanical condition in the same class as renal growths. He uses the word tumor as rarely as possible, but he considers the term of service if we wish to designate an enlargement of the kidney irrespective of the pathological cause. The term growth always means a true neoplasm.

The author recognizes the desirability of making a classification of

growths based on pathological characteristics, but realizes that at the present time it is "most scientific and serviceable" to group neoplasms according to histological characters. A perfect classification is not now possible, but "as a means to a more desirable end" a division should be made which is similar to or identical with the classification of tumors recommended by the Royal College of Physicians in 1896.

In the chapter on the frequency of renal growths we note that less than 0.19 per cent. of all deaths are due to primary growths—sarcoma is much commoner than carcinoma; secondary growths are rarely large, are often bilateral, and do not frequently cause kidney symptoms unless there is direct infiltration. Primary growths usually become large, and generally remain unilateral.

In discussing causation the author maintains that it is impossible to explain the presence of certain elements in some growths without invoking as an explanation the inclusion theory of Cohnheim. Some sarcomata develop during fœtal life, and Kelynack believes that such facts give probability to the view that embryonic inclusions existed. Such inclusions may become active during fœtal life, or may remain dormant for months or years, to become active, it may be, at a later period.

The author attaches only slight importance to the causative influence of heredity, and but little to trauma. In some cases trauma first directs attention to an organ already diseased; but there can be little doubt, says Kelynack, that the persistent irritation produced by calculi may lead to morbid growths in the renal pelvis or even in the parenchyma. The fact that malignant disease is more common in the young is proved by the following statement: Out of 160 cases of malignant disease, 84 cases, or over 52 per cent., were under ten years of age, and 74 of these were under five years of age. Malignant growths at this early age are sarcomatous. Carcinomata never arise in children, and are most common between forty and sixty years of age. Malignant cyst-adenoma may occur at an earlier age than does cancer.

The author says that renal growths usually attain a size which permits of palpation, and may even become enormous (thirty pounds in children, forty pounds in adults); but renal tumors which were too small to be palpated have caused death by hemorrhage.

The shape of the tumor is usually, but not always, reniform, "without irregularities and notches," but frequently the shape of the mass does not resemble the kidney, and irregularities and nodules may be felt.

A malignant tumor, we read, is disseminated chiefly by the veins. Dissemination by the lymphatic system is rare and never early. If lymphatic dissemination does occur, the adjacent glands become involved, but the retroperitoneal and more distant glands are not often affected. The glands most apt to suffer are those at the hilum, but the vertebral, mesenteric, cervical, or axillary glands may become diseased. It is very important to remember that, as a rule, a malignant tumor remains local for a considerable time after it begins to form. The author discusses in detail benign tumors (fibroma, lipoma, myxoma, chondroma, osteoma, angeioma, lymphangioma, and lymphadenoma); adrenal growths, adenoma, malignant cystadenoma, sarcoma, carcinoma, and perirenal growths. In discussing the symptomatology he emphasizes the following facts:

There is rarely bulging in the lumbar region, but is usually some

increase of resistance. The mass is never notched, is usually smooth, and if the entire kidney is involved is reniform in outline. If only a part of the organ is involved, as in adenoma, the outline is not reniform. The bowel is usually in front of the mass; but if the right kidney is involved, the cæcum and colon may be pushed to the inner side, and if the left kidney is affected the colon may be pressed outward. A mobile kidney may float forward in front of the colon or small intestine. The statement made by Musser, that "renal growths are always immovable, either by the hands or with respiration," is not correct; they are often distinctly, but slightly, movable. Guyon pointed out ten or twelve years ago that the kidney moves with respiration, and the reviewer, in common with many surgeons, has observed this fact. Before adhesions form ballottement can usually be obtained. Hemorrhage is an early symptom in 50 per cent. of cases, and hæmaturia without nephritis or cystitis always suggests tumor. Hæmaturia is more common in adults than in children. It may be an early symptom or even the first symptom. It may be late. It may be intermittent or persistent. It may occur but once or twice; it may be frequent. Bleeding is usually slight, but may be copious and even fatal. Marked hæmaturia is never caused by innocent growths. Pain is rarely of much value as a symptom. In some cases it is the first symptom, but it is often entirely absent until adhesions form. Symptomatic varicocele may occur. Uræmia is rare, but will probably arise if nephritis attacks the sound kidney. Pressure symptoms depend on the size of the tumor. The examination of the urine is often of little value, but if considered with the symptoms may be useful. Blood may be found. Albumin is rare if blood is absent. Pus will be found if there are calculi or suppurative conditions in the renal pelvis. Acetone is present in advanced cases. Characteristic cells are rarely found, but occasionally fragments of sarcoma can be detected. Epithelium and casts are often met with. The author is evidently not a believer in Rommelaere's alleged pathognomonic sign of cancer, as he does not refer to it. This sign is a diminution in the normal amount of NaP_2O_5 and NaCl. Cazin believes it simply points to cachexia.

In discussing diagnosis we believe the author should dwell more on the importance of obtaining the separate urine from each kidney when there is hæmaturia but no positive sign as to which kidney is diseased. The proper use of this method will lead to earlier operation in many cases.

Kelynack is a strong believer in total nephrectomy performed as early as possible. He places the mortality at about 50 per cent. We think this estimate somewhat high. Rovsing points out that recent operations show a much lower mortality than was formerly the case. He says that during eighteen years total nephrectomy has been performed 150 times for malignant disease. Before 1890 the mortality was between 50 and 66 per cent. Since 1890 the mortality has been between 20 and 25 per cent., the improved results being due to earlier operation. Partial nephrectomy, as proposed by Tuffier, for innocent growths is barely mentioned.

This book contains a great amount of very valuable information, and it should be read by all surgeons and physicians. The pathological observations are excellent. The original studies have been most carefully made, and all articles and reported cases have been found and considered. We would not be willing that our library should be with-

out it, but believe it would be made even more valuable by going more into detail in the chapters on Diagnosis and Symptoms and by having a surgeon write a comprehensive chapter upon the operative problems involved. J. C. DA C.

THE ESSENTIALS OF HISTOLOGY, DESCRIPTIVE AND PRACTICAL, FOR THE USE OF STUDENTS. By E. A. SCHÄFER, LL.D., F.R.S., Jodrell Professor of Physiology in University College, London; Editor of the Histological Portion of Quain's *Anatomy*. New (fifth) edition, revised and enlarged, with 392 illustrations. Pp. 359. Philadelphia and New York: Lea Brothers & Co., 1898.

THIS admirable text-book, so well adapted to the needs of the student in the laboratory, is too well known and appreciated to require very extensive mention. The present does not depart greatly in arrangement and contents from previous editions; some additions have been made to the text and to the number of illustrations.

The book presents a rare combination of brevity and completeness, the illustrations are apt and abundant, but should be used in connection with the actual specimens, for they are often too idealistic and diagrammatic to convey to the inexperienced student a true idea of what he should expect to see under the microscope.

The purpose of the book we take to be rather that of an introduction to the study of histology than of supplying a text-book of microscopic anatomy. Accordingly, about one-third of the volume is devoted to the important subject of the elementary tissues and cytological structures, and especial attention is given to the difficult study of fresh tissues and their behavior to the reagents. The student who conscientiously follows the lines laid down should become an adept in the use of the microscope and of reagents. The methods of preparing tissues are briefly but sufficiently described, and are, it is needless to say, reliable.

Embryology is dealt with only in so far as it is of importance in a proper comprehension of histology, which is rather an advantage than otherwise in a work of this character. The general tone is clear and concise. Little space is given to mooted questions, such as the minute structure of striped muscle, and they are discussed in the light of Professor Schäfer's own views. C. A. H.

A TEXT-BOOK UPON THE PATHOGENIC BACTERIA, FOR STUDENTS OF MEDICINE AND PHYSICIANS. By JOSEPH MCFARLAND, M.D. With 134 illustrations. Second edition, revised and enlarged. Philadelphia: W. B. Saunders, 1898.

IT was in 1849, just fifty years ago, that Pollender first saw bacteria in the blood of animals suffering from anthrax. Men are living and practising to-day who began their professional career before Pollender's discovery. It is almost stupefying to contemplate the advances they

have been enabled to witness in that brief period of time. Bacteriology has been one of the main factors in the great advance of medicine. From small beginnings, ridiculed and denounced, it has grown until it has become one of the most important branches of science, one to which we owe the discovery of the causes of many diseases, and to which we may confidently look for light on numerous dark places in our knowledge. Sanitary science has been quickened by it, and many branches of industry have been completely revolutionized. For the physician a knowledge of bacteriology is now almost as important as a knowledge of the urine. It is only necessary to mention the value of sputum examination and of the study of purulent exudates; the indispensability of bacteriology in the diagnosis and treatment of diphtheria, and the latest application of the science to the diagnosis of typhoid fever, Malta fever, etc. Whatever weapons the medicines of the future will possess against the infectious diseases it is most likely to receive from the hand of bacteriology. The literature of the science is enormous, and modern text-books are plentiful—our own countrymen have produced several of recognized value. The one before us is now in its second edition, and is a very satisfactory presentation of a limited part of the subject, that part, however, which is of the greatest practical importance, namely, the disease-producing bacteria. The book is divided into two sections—in the first, the author considers the biology of bacteria, immunity, sterilization, and disinfection, cultivation, and the bacterial examination of air, water, and soil. Part II. deals with the diseases produced by bacteria. A classification of these diseases is attempted, but cannot be called entirely satisfactory. Under present conditions it is, perhaps, wisest not to draw sharp dividing lines between toxic and inflammatory, or, as the author calls them, phlogistic diseases, or these and septic diseases. Some of the inflammatory affections are certainly toxic as well. The various diseases and their bacteria are discussed very fully and in a way that demonstrates the author's acquaintance with the literature. Malta fever and cerebro-spinal meningitis seem to have escaped mention. The living problems of bacteriology—immunity, antitoxins, etc.—are entertainingly considered. It might be well to include in future editions a brief chapter on the pathogenic yeasts.

The diction is superior to that commonly met in medical text-books.

The illustrations are numerous, and typographically the book is very attractive. D. R.

DISEASES OF THE EYE: A HANDBOOK OF OPHTHALMIC PRACTICE FOR STUDENTS AND PRACTITIONERS. By G. E. DE SCHWEINITZ, A.M., M.D., with 255 illustrations and 2 chromo-lithographic plates. Third edition, thoroughly revised. Philadelphia: W. B. Saunders.

IN presenting the third edition of this excellent text-book the author states in his preface that "particular attention has been given to the important relations which micro-organisms bear to many ocular disorders." The frequent references which are encountered in the text show that the author has kept himself well informed, and has utilized to the best purpose the rapid progress of ophthalmology. The work will undoubtedly continue to be one of the most popular text-books on diseases of the eye for both students and practitoners. W. C. P.

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Cardiac Epilepsy.—HERMANN BEER (*Klin.-therap. Wochenschrift*, 1898, No. 37) reports the case of a woman, aged fifty years, who for twenty years had steadily increased in weight, and for more than seven years had dilatation and hypertrophy of the heart and emphysema, with frequent attacks of loss of compensation. The woman suddenly had a convulsion and became unconscious, with increased cyanosis, dilatation of the pupils, and loss of pupillary reaction, deep and infrequent breathing, small and infrequent pulse, and bloody saliva. Ten days later there was another convulsion preceded by an aura, and in the course of a month three more attacks; but under treatment with bromides there was apparent recovery. The author considers this a symptomatic epilepsy, of the kind described by Mahnert and others as cardiac. The present case differs from those previously reported in having neither arteriosclerosis nor valvular lesion associated with the hypertrophy and dilatation. The remarks of the author and his classification of epilepsies are interesting, but contain nothing new.

DR. A. SMITH (*Münchener med. Wochenschrift*, 1898, No. 43) calls attention to cardiac epilepsy in the dilatation (formerly called idiopathic) of chronic alcoholism, and summarizes his experience as follows: 1. Under diseases claimed to be epileptic there is a large group in which neurotic predisposition and cardiac dilatation can be assumed to be associated, for the following reasons: The cardiac change can be demonstrated in the beginning, before epileptic symptoms appear. The latter then become more and more pronounced, and disappear with the improvement and recovery of the heart disease. 2. The dilatation is of alcoholic origin, as experiments show; it disappears, sometimes completely, with the cessation of the use of alcohol, but sometimes recurs at regular intervals for a time. In the former group a slight excess

can bring on an attack, in the second group the fits are not so readily brought on, but in the periodic dilatation alcohol is likely to bring on severe attacks. 3. Recovery is possible only after complete abstinence, but is accelerated by remedies that strengthen the heart muscles.

Hysterical Diaphragmatic Asthma.—E. BARTH (*Berliner klin. Wochenschrift*, 1898, Nos. 42 and 43) reports the case of a non-commissioned officer who suddenly became dyspnœic, and gradually grew worse, so that he was unable to remain on duty. There was no previous history of importance, except that about a year before the patient lost his voice for two weeks, apparently as the result of overuse in drilling. The patient was pale, but without cyanosis or œdema. The dyspnœa was very striking, being both inspiratory and expiratory, and with only five or six respirations per minute. The patient complained of shortness of breath and pain in the thorax and abdomen. The lungs were overdistended, but without ausculatory abnormalities. There was neither cough nor expectoration. The nose, pharynx, and larynx showed no alterations of importance. The pulse was small and weak, the heart-sounds weak and impure, and the case seemed at first one of cardiac asthma. It soon appeared that this view was not in accord with the absence of cyanosis, the freedom from anxiety, the activity of voluntary motion, and the relative absence of asthma when the patient thought himself not observed. At times the patient complained of "palpitation of the heart," but this proved to be a clonic spasm of the diaphragm, in which twenty to twenty-five contractions were followed by a pause, the whole attack sometimes lasting many hours. Along with this there were tonic and clonic spasms of the orbicularis oris and the sphincter of the eyelids. How long the condition had lasted before admission could not be learned, but after two weeks in the hospital it suddenly passed over into complete paralysis of the diaphragm. The lungs retracted to their normal volume; the heart-sounds became pure; the dyspnœa continued. Inspiration was forced, but expiration was easy, and gave the patient slight relief. Faradization of the phrenics and practice in voluntary respiration were soon followed by improvement, but the dyspnœic motions returned whenever the patient felt he was being observed. Finally, complete recovery was obtained, and in the four months since then there was no relapse. A résumé of the author's comments is hardly necessary. He quotes largely from the work of Wernicke on hysterical dyspnœa from faulty innervation of the phrenics (*Monatsschrift f. Psychiat. u. Neurologie*, 1898, p. 200). In accordance with the modern tendency in Germany, the attack is explained as possibly due to overexertion of the respiratory organs, and the overexertion of the adductors of the larynx in giving commands is suggested as the probable cause of the previous aphonia!

A Case of Cheiromegaly in Syringomyelia.—LUNZ (*Deutsche med. Wochenschrift*, 1898, No. 41) reports the following: A woman, aged thirty years, with a negative family history, began to have epileptic attacks at sixteen. Three years ago pains began in the right wrist and hand, shooting out to both sides. At the same time there were chilly sensations, and the patient frequently burnt her hand by trying to get it warm. About the same time the right hand began to increase in size. For a year there have been pains and a feel-

ing of chilliness in the left arm, back, and breast. The right arm, hand, and fingers are now considerably larger in all parts than the left, the increase being partly due to the soft parts and partly to the bone, as confirmed by the X-rays. The tactile sensibility is normal, as is also the sense of position and pressure and the muscular sense, but there is complete analgesia and loss of temperature-sense (ice and 40° C. cannot be distinguished) in the neck, back of the head and shoulders, the back to the ninth dorsal vertebra, the chest to the lower end of the sternum, and both upper extremities. There is no paralysis in the arms, but the strength is reduced in both, especially the right. The reflexes are lowered in the upper extremities, the knee-jerk increased, especially the right. Faradic reaction of muscles and nerves is lowered in the upper extremities. The absence of muscular atrophy is interesting. The changes in the bone as observed by the X-rays are like those described by Schlesinger in acromegaly.

Melanoplakia of the Mucous Membrane of the Mouth and the Diagnosis of Addison's Disease.—Fr. Schultze (*Deutsche med. Wochenschrift*, 1898, No. 46) calls renewed attention to pigmentation of the mucous membrane of the mouth, occurring in certain chronic diseases, especially cancer of the stomach. Stomatitis, cirrhosis of the liver, and jaundice may also be followed by pigmentation in the mouth that may excite the suspicion of Addison's disease. He describes a case in which there were discolorations in the skin and blackish spots on the soft and hard palate and gums. There was ascites, with reddish-yellow fluid of specific gravity 1017 in the peritoneal fluid. The spleen was enlarged. Tuberculosis, cirrhosis of the liver, and Addison's disease seemed possible, yet the patient was observed for seventeen months without other signs of that affection. In another case there was an old history of biliary colic, later irregular and intermittent fever, with chills, and jaundice. The skin showed brownish or yellowish discolorations (not jaundice), and there were grayish-brown areas in the mouth, with atrophy of the mucous membrane in the pigmented parts. Dulness over the left apex, with moist râles, strengthened the suspicion of tuberculosis and Addison's disease. The patient gained in weight, but later had a recurrence of biliary colic. An operation revealed extensive adhesions around the gall-ducts and gallstones, with small foci of suppuration. The patient recovered, but later had tuberculous epididymitis and orchitis, for which he was successfully operated. The author also describes a case with the asthenic symptoms of Addison's disease, but without discoloration, in which the autopsy showed only gastro-intestinal atrophy. [That pigmentation of the mucous membrane of the mouth is not a certain sign of Addison's disease will hardly be denied. On the other hand, the chronic course and partial improvement in the cases cited do not exclude Addison's.—Ed.]

The Dyspepsia in the Early Stage of Pulmonary Tuberculosis.—W. Croner (*Deutsche med. Wochenschrift*, 1898, No. 48) has investigated this subject by examinations not only on persons with gastric symptoms, but also in those in whom accidental dyspepsia, as from fever and alcoholism, might be excluded. There was nothing characteristic about the symptoms of tuberculous dyspepsia—eructations, a feeling of pressure in the epigastrium, succus-

sion above the umbilicus, and irregular defecation being the most common. Dilatation of the stomach was not demonstrable in any case, and gastroptosis was rare and never severe. In no case was the motor power notably lessened. The chemical results varied greatly. The total acidity varied from 21 to 80, in most cases was about normal, but more frequently below than above. In only five out of thirty-six cases was HCl absent. It was not possible to find any relation between the chemical conditions and the symptoms. The author discusses the various explanations of the gastric alterations found, such as fever, swallowed sputum, anæmia, chronic gastritis, etc., and comes to the conclusion that the alterations are functional. The variable reactions and the inconstancy of the symptoms point to the same thing. The author also refutes the idea that the gastric symptoms of early phthisis are due to overfeeding in any considerable proportion of cases.

Disease of the Pancreas in Hereditary Lues.—According to SCHLESINGER (*Virchow's Archiv*, Band cxliv., Heft 3, S. 501) syphilitic involvement of the pancreas is rare in acquired lues. But few are recorded in the literature. On the other hand, the pancreas is comparatively frequently involved in inherited lues in the new-born child and in infants. This fact was first emphasized by Birch-Hirschfeld in 1875. He found the pancreas more or less extensively involved in thirteen cases out of a total of twenty-three autopsies on fœtuses or infants with hereditary lues. Since 1875 no observer has found the pancreas diseased in such a large percentage of cases. Birch-Hirschfeld published a second series of cases in 1880, in which he found the pancreas involved twenty-nine times in a total of 124 cases. Since Birch-Hirschfeld's first publication there has been no accurate study of disease of the pancreas in hereditary lues, and, for this reason, Schlesinger undertook the study of the gland, paying special attention to the histological changes produced.

Schlesinger draws the following conclusions from his study:

1. In hereditary lues the pancreas is less frequently involved than the spleen, liver, bones, and lungs, but oftener than the thymus, heart, or intestine.

2. Contrary to the view formerly held that the pancreas became involved only in the later months of fœtal life, it may become diseased as early or as late in intra-uterine life as do the other organs.

3. There is no close relationship between syphilis of the pancreas and coexistent disease of other organs. In exceptional cases the duodenum is diseased, and then both the pancreas and liver are usually involved.

4. Macroscopically, the first change in the pancreas is its increase in consistence and then its increase in size. The gland may become cartilaginous in its hardness, the head becoming more extensively involved than the tail.

5. Adhesions between the gland and adjacent organs are common.

6. The lesion is a diffuse interstitial pancreatitis, involving first the interlobular, then the interacinous, and finally the intercellular connective tissue. This process may be so extensive as to destroy completely the glandular portion proper.

7. No degenerative changes accompany the atrophy.

8. The connective tissue proliferation nearly always commences about the bloodvessels, rarely about the excretory ducts.

9. Syphilitic gummata are rare in pancreas in hereditary lues of infants as compared with their frequency in acquired syphilis.

10. The large and small ducts rarely show proliferation of the connective tissue about them.

11. Of the vascular changes pericarditis and endarteritis of the interlobular vessels and destruction of the periacinous capillary network are the chief ones.

12. The intertubular collections of cells, which are more abuandant in children than in men, were not involved in the connective-tissue proliferation nor in the atrophy of the parenchyma.

The True Function of the Thymus.—J. BEARD (*The Lancet*, January 21, 1899, p. 144) made an exhaustive study of the thymus gland, using the thymus of one of the vertebrates, Raia batis, the smooth skate. Since Kölliker discovered that the thymus originates in mammals from the epithelium of a gill-pouch, and since he stated the original epithelial cells gave rise to lymph cells or leucocytes, two views have been entertained regarding the function of the gland. Stieda and His maintain that the leucocytes which always form an integral part of the gland soon after its formation are not produced in the gland, but migrate thither, probably from the mesoblast. According to these observers Hassal's concentric corpuscles are supposed to be formed from the original epithelial cells, and the function of the gland is still absolutely unknown. Stieda and His made no attempt to associate the Hassal corpuscles with the origin of the leucocytes. Kölliker first discovered that for a relatively long period of fœtal development the blood contained only nucleated red corpuscles and no leucocytes whatever. H. E. Ziegler ventured the opinion that this condition persisted until some lymphoid organ developed.

In studying the thymus of the smooth skate in sections of embryos 17 to 22 mm., Beard was able to demonstrate quite easily the transformation of the epithelial cells of the thymus into leucocytes. A one-eighteenth Zeitz oil immersion lens was used. The first change in the epithelial cell is one in its protoplasm or cytoplasm. This becomes somewhat more refractive, and in favorable sections takes on a somewhat brownish tinge. At first no alteration can be noticed in the nucleus, which is oval as in the other epithelial cells. Then it becomes rounded, and gradually the whole cell acquires this shape. With this and the marked refractile nature of the protoplasm the cell, according to Beard, takes on the characters of a leucocyte. These leucocytes for a time remain within the mass of epithelial cells, and later can be seen to migrate one by one into the mesoblast and elsewhere. He states that these cells do not wander into the epithelium of the thymus, because until some are formed within the latter there is no source in the body whence they could be derived. In embryos 22 mm. in length a few leucocytes are found in the blood itself. Beard holds that the absence of leucocytes in the earliest period of embryonic blood in vertebrates persists until the first ones are formed within the thymus-epithelium, and from its epithelial cells. In embryos from 28 to 42 mm. long the formation and emigration of leucocytes from the thymus becomes very active, and at this time there is no part of the embryo, including the blood, that is not infiltrated with leucocytes. This happens before lymphoid structures are developed elsewhere within the body

of the smooth skate. Beard, then, believes with Kölliker that the formation of leucocytes is a function of the thymus gland. As a result of his work, he thinks that he has definitely proved that not only does the thymus form leucocytes, but that it is the parent source of all the leucocytes of the body.

Treatment of Obesity with Thyroid Preparations.—Ebstein (*Deutsche med. Woch.*, 1899, No. 1, p. 1; No. 2, p. 23) reviews the history of the administration of thyroid preparations in the treatment of obesity, and credits Yorke-Davies with its introduction for this purpose. He refers to the popularity of the treatment in England, and the warning which Burroughs, Wellcome & Co., the manufacturers of the tablets, gave against the abuse of the treatment by the laity, when the administration of the drug is not supervised by a physician. Without such supervision the possibility of thyroidism and other dangers is considerable. The treatment was advocated in Germany first by Leichtenstern and Wendelstadt, who claimed excellent results for it.

Ebstein declares strongly against the thyroid treatment of obesity. He published the records of seven cases in which he had followed this treatment in the Göttingen clinic. In all the cases there was a slight reduction in the body-weight, but not more than could be obtained by proper dieting.

Ebstein gives the following reasons against the use of the thyroid treatment:

1. The results obtained are unsatisfactory, because the diminution in weight is not constant, and may not occur at all. The diminution in weight frequently ceases, even when the thyroid preparation is being administered or shortly after it is stopped. There is no improvement in the patient's subjective feelings under the treatment.

2. The treatment is not a rational one. The ideal treatment is the one where only the fat is lost. In the thyroid treatment there is waste of the body albumin as well, as the studies in metabolism have shown.

3. Any improvement following the administration of thyroid preparations can be obtained with less danger by proper dieting.

Acute Diffuse Myocarditis.—G. Freund calls attention to the difficulty of diagnosis in acute purulent myocarditis and the frequency with which it is associated with rheumatism and diseases of the joints. In his case the process developed during an attack of subacute rheumatism. The clinical symptoms were not very clear. In the beginning the mental symptoms suggested salicylic-acid poisoning, but on discontinuing the drug there was no change. The increasing paleness, the large size and hardness of the spleen, and the pain under the sternum suggested leukæmia, but the blood examination was negative. A cerebral affection, especially meningitis, was considered, but discarded as the result of negative lumbar puncture. Because of association with rheumatism, and the presence of a normal temperature, with dull heart-sounds, a diagnosis of endocarditis was made. The author cites a number of cases from the literature in which acute purulent myocarditis was proved post-mortem to be associated with or a sequel of rheumatism and diseases of the joints. The signs and symptoms often are so contradictory in different cases that it is impossible to lay down rules for diagnosis. The differentiation from endocarditis and pericarditis is most difficult. The

persistent pain in the præcordia has been mentioned by many observers, and is often associated with a feeling of anxiety in contrast to the absence of other threatening symptoms. The exclusion of endocarditis and pericarditis is always essential.—*Berliner klin. Wochenschrift*, 1898, Nos. 49 and 50.

Typhoid Fever and Trichinosis.—H. FISCHER (*Deutsche med. Wochenschrift*, 1898, No. 52) reports an old observation, being the case of a young butcher who developed typhoid fever and trichinosis simultaneously. Two days after eating excessively of raw tainted meat he had chills, loss of appetite, pains, and great weakness of the limbs. Six days later he was admitted to the hospital with all the signs of a severe typhoid. A large bed-sore developed over the sacrum. On removing the gangrenous tissue a piece of healthy muscle was accidentally cut away, which even to the naked eye appeared thickly studded with trichinæ. Microscopical examination showed the trichinæ to be very near each other and encapsulated, the capsules still transparent, and the parasites very lively. The patient died of pneumopleuritis. The autopsy showed the typical lesions of typhoid fever in the ileum. There were many trichinæ in all of the muscles. The clinical signs of trichinosis were unimportant, those of typhoid fever dominating the clinical picture. Neither œdema nor stiffness of the muscles was observed. The trichinæ grew and increased undisturbed by the high septic fever or the changes in nutrition and structure of the muscles caused by the typhoid fever.

Peptic Duodenal Ulcer.—In opposition to the generally accepted opinion BURWINKEL (*Deutsche med. Wochenschrift*, 1898, No. 52) contends that it is possible to differentiate duodenal ulcer, *intra vitam*, from round ulcer of the stomach, and adds to the eight and five cases reported by Chvostek and Boucquoy, respectively, five of his own. All the patients gave a history of long-continued bending over while at work. In four there was a family history of tuberculosis, and in the fifth it could be looked on as probable. His diagnoses, however, were not confirmed by autopsy. The points upon which he based his diagnosis are the following: 1. Melæna not to be explained by tuberculosis, cancer, or "essential" intestinal hemorrhage. The actual hemorrhage is often associated with syncope and vomiting, with no blood in the vomitus 2. The seat of the pain is not always in the right hypochondrium, as has been supposed, but at times in the region of the navel, or between that and the right costal border. The pain does not radiate to the back, as in gastric ulcer, and usually appears two or three hours after meals, or later, if the gastric digestion is delayed. 3. In all the cases there is a history of prolonged dyspepsia, in which the symptoms of ulcer appear at intervals. In the dyspepsia constipation is the rule, but the tongue is rarely so coated as in chronic gastritis, and there is no *fœtor ex ore*. The appetite is retained, even in the attacks—a fact that has been used to explain the speedy improvement in many cases. Icterus is rarely pronounced, and probably occurs only when the ulcer is near the orifice of the common duct. 4. Duodenal ulcer often affects men in the prime of life—strong and robust, and, in most of the author's cases, careful in their mode of life. The author's remarks on prognosis and treatment present nothing new.

The Coincidence of Bitemporal Hemianopsia and Diabetes Insipidus.—SPANBOCK and STEINHAUS have investigated this subject, concerning which it has been assumed by many that there is a frequent association, yet the anatomical basis of which is, *a priori*, difficult to understand. Out of some fifty cases of temporal hemianopsia polyuria has been noted in eleven. In six of these there is no clinical evidence of the existence of diabetes insipidus. In four more the bitemporal hemianopsia is not conclusively demonstrated, and the symptoms point to wide-spread lesions of the brain. There remains only the case of David, in which the hemianopsia, though not entirely pure, was present with normal eye-grounds, and repeated examinations put the diagnosis of diabetes insipidus beyond doubt.

The authors add a case of their own. This was in the case of a married woman, aged thiry-three years, syphilitic. Polyuria and polydipsia appeared, soon followed by loss of vision in the temporal fields. Examination showed a typical bitemporal hemianopsia. The urine amounted to six litres in twenty-four hours, specific gravity 1003, pale and clear, without sugar or albumin. A diagnosis of syphilitic disease in the floor of the fourth ventricle and the optic chiasm was made, and treatment with injections of mercury sozojodolate, with large doses of potassium iodide, begun. After the third injection the eye-symptoms improved, and after the fourth they disappeared, though the diabetes persisted. Still later the latter ceased, and the patient regained her former weight and health. From this case the authors conclude that the combination of diabetes insipidus and hemianopsia is purely accidental, and that the course in any case will depend on the nature of the lesions concerned and the possibility, as in their case, of successful treatment.—*Deutsche med. Wochenschrift*, 1898, No. 52.

PEDIATRICS.

UNDER THE CHARGE OF

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Classification of the Anæmias of Infancy.—JOHN L. MORSE (*Archives of Pediatrics*, November, 1898, p. 815) reports a marked case of anæmia in a child of ten months, characterized by enlargement of the liver, spleen, and glands, with moderate increase in the number of leucocytes, poikilocytosis, and a great preponderance of large, nucleated forms, suggesting a pernicious anæmia. The diminution in the number of red cells was slight, however, and much less than that which usually occurs in this condition. The increase in leucocytes was moderate, being much less than that which usually occurs in leukæmia, which disease was suggested by the enlargement of the liver, spleen, and glands. The clinical history and blood condition corresponded

pretty closely to those of "anæmia infantum pseudo-leukæmica," as described by Luzet and Alt and Weiss. This condition, however, the author thinks cannot be considered as a disease *sui generis*, but merely as a severe form of secondary anæmia with leucocytosis, and under this head he classes the case described, which he considers simply as an example of a large and irregular class of cases. The cause of the anæmia in his case was undoubtedly to be sought in general malnutrition resulting from improper food; while the splenic tumor was regarded as a mere coincidence, a result of the same cause, as shown by the fact that it became smaller as the case progressed, and probably finally disappeared altogether.

He refers to the difficulty in classifying the anæmias of children owing to the tendency to exaggeration of changes and to reversion to a younger or to a fœtal type of blood; to the frequency of splenic enlargement in all forms of blood disease in infancy; to the greater rapidity and degree in which leucocytosis develops in children, and to the fact that myeloycetes occur in less severe conditions and in greater numbers than in adults, and that the percentage of hæmoglobin is almost always relatively low. For these reasons he believes that only a very simple classification is justifiable in the light of our present knowledge, and he suggests the following modification of Monti's as a fairly satisfactory one: *Secondary*—Mild anæmia, mild anæmia with leucocytosis, severe anæmia, and severe anæmia with leucocytosis. *Primary*—Pernicious anæmia, leukæmia. In all these forms there may be greater or less splenic enlargement. Splenic tumor, therefore, is of little or no aid in the differential diagnosis of the anæmias of infancy. Under the head of severe anæmia with leucocytosis, he thinks, for the present, must be included all those anomalous cases which do not correspond to the type of either pernicious anæmia or leukæmia, and in this class he includes the cases which have hitherto been described as anæmia infantum pseudo-leukæmica.

Cyclic Vomiting.—H. B. WHITNEY (*Archives of Pediatrics*, November, 1898, p. 839) details a typical case and reviews the literature of the subject, starting with Leyden's description under the head of periodical vomiting, which appeared in 1882. The affection is rare. It is often very severe, and attacks come on without discoverable cause and persist for from twelve hours to four or five days. These gastric crises occur at intervals of from six weeks to six months. In the author's case an interval of three months was observed between attacks occurring over a period of a year, excepting one interval of two months, and in several instances they fell upon the same day of the month. Pathologically, the affection seems to be a gastric neurosis. In certain cases migrainous attacks have alternated with those of the purely gastric condition, and Rachford has observed a gradual transition with advancing youth from early cyclic vomiting to a definite migraine. It is interesting to observe that Rachford has found a large excess of poisonous alloxuric bodies, particularly paraxanthin and heteroxanthin, in the urine of persons suffering from such crises as those of migraine and periodical vomiting.

Whether or not this affection is lithæmic in character, it is certain that there are important predisposing factors, among which are early age. In most cases, also, there is probably a decided neurotic taint, either in the

child's past history or in his parentage. It was so in Rachford's cases, and in the one reported by the author the child was thin, nervous, and rather precocious, with gout, migraine, tuberculosis, and insanity in its immediate ancestry. Treatment embraces general hygienic measures, the use of large quantities of fluid, especially milk, and some one of the various lithia waters, with salol or salicylic acid, and the maintenance of an active condition of the bowels.

Unusual Complications of Epidemic Parotitis.—W. ZINN (*Centralblatt f. die med. Wissenschaften*, 1898, No. 51) reports two cases that show that inflammation of serous membranes may occur occasionally in the course of this disease. In the first case, a school-boy, aged thirteen years, there developed during the course of the disease high temperature and endocarditis, with signs of mitral insufficiency. The symptoms became insignificant after the subsidence of the disease. The second patient, a man, aged twenty-two years, when first examined presented high fever, diarrhœa, and symptoms of peritonitis. On the seventh day double parotitis developed, and with resolution the abdominal symptoms disappeared.

A severe acute nephritis was reported recently by C. G. KERLEY (*Archives of Pediatrics*, February, 1898), beginning on the sixth day of an attack of mumps in a boy aged four years. Under appropriate treatment the urine became normal at the end of six days.

The Value of Metallic Percussion Combined with Auscultation in the Diagnosis of Pleural Effusion in Children.—MOUSSOUS (*Revue mensuelle des Maladies de l'Enfance*, January, 1899, p. 1) calls attention to metallic percussion with auscultation (the coin-test) in the diagnosis of pleural effusions in children, and considers it a most valuable means in distinguishing between the dulness due to pleural effusion and that depending upon pulmonary consolidation.

The value of the coin-test in adult patients in conditions other than pneumothorax has already been investigated by Pitres, and later by his pupil, Sieur. Their observations have shown that when the lung is healthy the sound transmitted to the ausculting ear is obscured, smothered, and without metallic timbre. In the presence of a liquid effusion, however, whether it be serous, fibrinous, purulent, or sanguineous, formed in a pleural cavity free from adhesions, the transmitted sound has a clear, sharp, metallic ring.

Ordinary congestions of the lung and the ordinary inflammatory or neoplastic indurations fail to give the coin-test in its purity. The same is true of broncho-pneumonic foci, hæmoptoic infarcts, tuberculous infiltrations, and even encysted pleurisies and liquid effusions of the pericardium. Not only may the presence of fluid thus be recognized, but also the upper limit of the effusion in pleuro-pneumonia and the portion of the zone of dulness which corresponds with the effusion in pleurisies with false membrane. The author has devoted several years to study of this test as applied to young infants with the hope of proving its value in a class of cases which offers greater difficulties in diagnosis than do similar conditions in the adult, and has demonstrated to his satisfaction that this test constitutes a very valuable addition to the ordinary methods of diagnosis.

He finds that in the young child, as in the adult, the metallic click is muffled and loses its ringing timbre in traversing a healthy lung. The percussion should be made more gently than in the adult, and the non-auscultating ear should be stopped. The same quality in the transmitted sound is to be observed with broncho-pneumonia and croupous pneumonia. In these cases auscultation is made at the point where the vesicular murmur was suppressed or replaced by râles (whether dulness be present or not), the percussion being practised at a point on the hemithorax diametrically opposite. Not only is the sound impure and without metallic ring, but the sound of the stroke itself is enfeebled, and is notably more muffled than on the healthy side; sometimes it disappears entirely. In the presence of pleural effusions, however, the coin-test was very clear in four out of seven cases, and in the remaining three cases was clearer than on the healthy side, but lacked the silvery quality. In six cadavers of young infants varying in age from a few days to one year, with one of a child of six or seven years, artificial pleural effusions were produced with varying quantities of liquids, and the coin-test compared with the results before injection. In no case was the metallic timbre observed before the effusion was produced, while in only two instances did the sign fail, and in one of these the sound was clearer, but its metallic quality was not distinct. In both these cadavers, however, larger quantities of fluid (above 200 grammes) gave a successful test.

[When one considers the frequent confusing results offered by physical examination of the chest in young children, even when fluid is present in considerable amount, the value of an additional physical sign, though not absolutely pathognomonic, cannot be too highly estimated. It is to be hoped that more extensive clinical experience will confirm the promises of Dr. Moussous's observations.]

Sudden Death in the Course of Addison's Disease in Childhood.—VARIOT (*Journal de Clinique et de Thérapeutique*, 1898, No. 2, p. 23) reports two cases of Addison's disease in girls of fourteen years and fourteen and one-half years of age, which terminated suddenly in death, due probably to syncope. In the second case autopsy was made. There were extensive and thick adhesions of the costal and parietal pleura; disseminated miliary tubercles in both lungs. The heart was relaxed, but without valvular lesions. The liver was adherent to the diaphragm and to adjacent organs by quite firm false membranes. The kidneys were normal in appearance. Both suprarenals were greatly enlarged and of firm consistence. On section the greater part of the parenchyma was replaced by caseous, confluent yellowish tubercles.

The author thinks that sudden death is relatively frequent in the course of Addison's disease in the child, for of four cases which he has observed, two terminated in this manner.

The Influence of Phosphorus upon Rachitis.—MIWA and STOELTZNER (*Jahrbuch f. Kinderheilkunde*, Bd. xlvii. S. 153) have made a series of experiments in Heubner's laboratory by giving phosphorus to rabbits and hens, and then after a time examining the bones of these animals to discover the changes therein produced by this drug. In comparing the bone lesions observed in these animals with those of rachitis and those produced in work-

ers in phosphorus, they have found that under the influence of this drug the normal spongy tissue is replaced by a sclerotic tissue, and that this effect is produced wherever the bones have a tendency to become porous. As osteoporosis and osteosclerosis are antagonistic processes, phosphorus may be considered as a direct remedy against osteoporosis. In rickets, however, the anatomical lesions are quite different, and, therefore, phosphorus cannot be considered a direct or specific remedy in this affection.

[These results confirm the earlier experiments of Wegner along the same lines, and give support to the skepticism with which many observers regard Kassowitz's enthusiastic advocacy of the phosphorous treatment of rickets to the exclusion of the well-founded claims of cod-liver oil.]

The Bacteriology of Pertussis.—O. ZUSCH (*Münchener med. Wochenschrift*, 1898, No. 23, S. 712) describes a bacillus which he has constantly found in the sputum of twenty-five children suffering from this disease. It is found in profusion in the mucus, more rarely in the interior of the cells, grouped irregularly, often in clumps.

This organism is best cultivated upon agar mixed with ascitic fluid, and these colonies flourish upon bouillon and upon gelatin without liquefaction. These cultures are not agglutinated by the blood serum of pertussic patients, but the bacillus is found in the sputum principally during the first two or three weeks of the disease—that is, during the initial catarrhal stage and at the beginning of the convulsive stage. If extensive bronchitis occurs the number of bacilli is considerably diminished. In one case in which a broncho-pneumonia interrupted the convulsive cough the bacilli disappeared from the sputum. Intratracheal inoculations failed in the dog, rabbit, guinea-pig, and white mouse.

Paralysis in Whooping-Cough.—LEROUX (*Journal de Clinique et de Thérapeutique Infantiles*, 1898, Nos. 13–17) presents a study based upon thirty-eight cases. Naturally, very young children, from one to five years of age, furnish the largest proportion of the cases, and such accidents usually appear during the convulsive stage or in its decline. Almost always the disease is severe, with violent paroxysms, fever, and often complicated with secondary infection, like broncho-pneumonia, and sometimes by coincident infections (influenza, scarlatina, tuberculosis). Four groups of cases, from a symptomatic stand-point, may be recognized:

1. *Cerebral Paralysis.* The onset is usually sudden; during a paroxysm convulsions occur, followed by coma, which terminates in death or in return of consciousness, when the paralysis becomes manifest. More rarely hemiplegia or monoplegia comes on slowly. Exceptionally the child develops a cerebral encephalopathy analogous to that of rheumatism: convulsion, coma, hyperpyrexia, and death; and, again, may quickly succumb to a true apoplectic stroke. Most frequently, however, with or without convulsions or coma at the onset, any of the varieties of hemiplegia may be observed: simple hemiplegia with facial palsy and attacks of Jacksonian epilepsy; slowly developing left hemiplegia with conjugate deviation of head and eyes to the right. Again, one may encounter diverse monoplegias, aphasia with hemiplegia or monoplegia, and sensory aphasia. And, finally, to complete

the list, may be added transitory hemianopsia, temporary or permanent blindness and deafness, palsy of the sixth and seventh pairs, and hemiplegia with palsy of both motores oculi. These paralyses pass away, in about half the cases, in a few days or weeks. In the remainder permanent lesions remain.

2. *Spinal Paralysis.* Two cases of paraplegia are on record: one of sudden onset during a kink, terminating in recovery (Bernhardt); the other complicating a febrile attack (Mœbius).

3. *Peripheral Paralysis.* Two cases may be attributed to peripheral neuritis: palsy of the flexors and abductors of the feet and great toes (Surmay), and palsy of the posterior crico-arytenoids (Jurasz); two others to polyneuritis; ascending palsy of the four members and of the muscles of the head, and paralysis of diaphragm, with recovery (Mœbius); paralysis of the limbs, of the nuchal muscles, and of the deeper muscles of the back, also terminating in recovery (Moussous).

4. *Cerebro-spinal Paralysis.* One case of disseminated sclerosis is recorded (Sparks). Prognosis is serious, being the graver the younger the child. Of the thirty-eight cases collected six resulted in death; in one-third of the cases paralysis persisted; while in half complete cure resulted in from several days to several weeks.

In the few autopsies made the following lesions of the brain, sometimes of the cord, have been encountered: congestion, hemorrhages within or without the meninges or in the brain, foci of softening, vascular changes, and dissecting capillary aneurisms.

Laryngeal Complications of Measles.—FRAENKEL (*Revue mensuelle des Maladies de l'Enfance*, October, 1898, p. 508) reported to the Société de Biologie de Hambourg four cases of measles terminating fatally with laryngitis, in which the autopsies showed ulceration of the vocal cords and of the arytenoid region of the larynx, in some portions involving the structures down to the perichondrium and even the cartilage itself. Had recovery taken place these lesions would have been followed by phonative or respiratory disturbances. These lesions are comparable to the laryngeal ulceration or necrosis observed in typhoid or typhus fevers.

A Method of Obtaining Sputum of Young Children for Bacterioscopic Examination.—H. MEUNIER (*IV. Congrès pour l'Etude de la Tuberculose*, Paris, 1898) practises a simple lavage of the stomach in order to obtain the swallowed bronchial secretions; in these masses the tubercle bacillus is sought for by the usual methods of examination. The lavage is best practised in the morning fasting, shortly after the fits of coughing that almost always occur after waking. This method is only applicable to cases in which there is a purulent bronchial secretion. Negative findings after several examinations of the sputum, in the face of positive physical signs of softening or suppuration, will greatly aid in excluding tuberculous disease and confirming the existence of one or other of the conditions associated with pulmonary suppuration, such as dilatation of bronchi, encysted or interlobular pleurisies discharging through the bronchi, and ulcerating broncho-pneumonia.

SURGERY.

UNDER THE CHARGE OF

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The Radical Treatment of Hydrocele.—After repeated trials, with varying success, in the radical treatment of hydrocele by the methods at present in vogue, BLOCH (*Revue de Chir.*, February 10, 1898) finds that none are entirely satisfactory or reliable.

The essentials of a radical treatment are that it shall be without danger; that it shall prevent recurrences; that it shall be without pain; and, finally, that it shall permit the patient to resume his ordinary business in the shortest possible time.

The following method, which the author has performed forty times, fulfils all these indications:

A sufficiently long incision is made to permit a complete reversal of the tunica vaginalis, so that it and the testicles are entirely exposed to view and can readily be treated. If there are any excrescences they are cut off. The entire surface of the tunica vaginalis is then vigorously scrubbed with sterilized gauze soaked in a 3 per cent. carbolic solution. Care should be taken to touch all the serous surface, the testicle, and all the little folds. The testicle is then reduced into the scrotum, the cavity packed full of iodoform gauze, one end of which should protrude from the wound, and an aseptic or antiseptic dressing applied.

Three or four days later the iodoform gauze is removed. Frequently it will require considerable force to extract it, and there may be a slight hemorrhage; if not, the entire cavity is found to be dry. The wound is then closed with catgut without drainage, and an iodoform gauze dressing applied with some sterilized cotton and a suspensory bandage. The sutures are applied in the skin only, and do not include the tunica vaginalis.

The complete evisceration of the testicle and reversal of the tunica vaginalis are essential to a complete operation. The rubbing modifies the serous surface so that it does not secrete, and the carbolic solution coagulates the albumin of the epithelium. The inflammatory reaction produces a discharge which must be absorbed, hence the use of iodoform gauze packing, which also favors an acute reaction, and this favoring adhesive inflammation of the tunic. The sutures close the wound and prevent infection. There is no pain, and the patient can get about the day after the sutures are removed, and sometimes the day after the operation. In one case only—in a patient sixty years of age, where vigorous rubbing could not be employed—was a

relapse found, although all the cases were examined, some after a lapse of five years.

The employment of general anæsthesia is preferred, as vigorous treatment under other conditions produces too much pain. The testicle is most readily reduced by holding the edges of the wound well open with forceps.

Penetrating Gunshot-wound of the Abdomen; Immediate Laparotomy; Suture of Stomach; Recovery.—In connection with the recently reported results on the operative and non-operative treatment of this form of injury occurring in battle, the successful operation reported by COUSINS (*British Medical Journal*, July 16, 1898) and the inferences he draws regarding treatment are of especial interest:

The patient received a wound which passed entirely through the abdomen and involved the stomach. Severe pain immediately followed the accident; the patient was cold and livid and the pulse rapid and wiry, about 150 per minute.

After a time the patient rallied sufficiently upon stimulation with brandy and strychnine to make an operation possible. The wound of entrance was followed, the wound in the stomach found and closed, and the patient made a complete recovery.

Regarding treatment by immediate laparotomy the author says: "We may now accept it as a surgical axiom that in every case of penetrating wound in which there is reason to believe that an internal injury has been inflicted, the abdomen ought to be opened, with the intention of arresting hemorrhage, securing by suture any lacerated or wounded organ, removing blood or any other extravasated fluid, and cleansing the peritoneal cavity. In cases of gunshot injury, whenever a projectile has penetrated the abdomen and urgent symptoms are present, it is surely useless to hope that the viscera have escaped damage. As soon, then, as the patient has sufficiently rallied from the shock an exploratory operation is clearly indicated, and any delay for the development of more urgent symptoms aggravates the danger, as these can be only the outcome of pathological changes which are associated with septic poisoning and fatal peritonitis. In many cases the chance of success rests wholly on immediate action."

Successful Operation for Perforating Gastric Ulcer.—CAMPBELL (*British Medical Journal*, July 16, 1898) reports a successful operation for gastric ulcer. The success he attributes to the early diagnosis and immediate operation. There was a considerable amount of lymph and milky fluid present in the peritoneal cavity. It was, however, localized and the infection had not become general. The perforation was about half an inch in diameter. The peritoneum was sponged out after plugging the wound with gauze. Freshly boiled towels were packed in the peritoneal cavity and the stomach brought to the surface. The edges of the perforation were freshened and then sutured with a continuous silk suture that took in the entire thickness of the stomach. A dozen Lembert sutures were then applied and the wound finally covered by a piece of peritoneum. The peritoneum was again carefully sponged and a drain of gauze inserted where the largest amount of gastric contents had been. The remainder of the abdominal wound was closed.

Nutrient enemata were kept up for five days; then water was given by the mouth, followed by animal extracts, and then milk. The gauze drain was removed on the fifth day. The pulse and temperature fell shortly after the operation, and the patient made a complete and permanent recovery.

A New Suture for the Intestines.—BARKER (*British Medical Journal*, July 16, 1898) describes a new self-feeding needle and holder with which he is able to place in the intestine with an ordinary fine sewing-machine needle a suture that is like the sewing of a machine. It is, however, capable of introducing any form of stitch desired. The handle of the needle-holder carries three reels of thread and holds the needle in any desired position. In introducing the sewing-machine stitch the following method is employed: The needle is passed through the tissue and the loose end caught and drawn out a little longer than the length of the wound. The needle is then passed a second time and withdrawn slightly, leaving a loop; the loose end of the thread is passed through this and drawn tight at the same time the needle is withdrawn and its thread tightened. The same process is carried out with each stitch to the end, where the final stitch is tied. This saves all the time and trouble of tying the sutures, with the exception of the last. The self-threading needle the author does not claim to be new, but the stitch he believes to be new and original.

Colica Vermicularis.—GOLDBACH (*Prager med. Wochenschrift*, 1898, No. 16) reports a case of this disease which has been described by Bruer. It is a condition of colic in the vermiform appendix occasioned by a catarrhal inflammatory process in which only a slight irritation of the serous covering of the appendix is produced. It is the result of a blocking of the outlet of the appendix, which can be produced by different forms of calculi, by the contents of the bowel, and by bacterial action. It can also be the result of an inflammation of Gerlach's valve, which closes the lumen of the appendix. The symptoms are pain localized in the appendiceal region, but with an entire absence of fever and complete freedom from all symptoms between the attacks. There is no implication of the serous covering of the appendix. In the case reported by the author it was found that the entrance into the appendix had been closed by an intestinal concretion which readily slipped in and out, thus accounting for the intermissions between the attacks.

Case of Removal of the Entire Stomach for Carcinoma; Successful Œsophago-duodenostomy; Recovery.—One of the successful operations that have followed the removal of the entire stomach by Schlatter, of Zurich, is reported by BRIGHAM (*Boston Medical and Surgical Journal*, May 5, 1898).

The patient was a woman of good constitution, aged sixty-six; she was particularly fitted to stand the operation by reason of her simple tastes and even temperament.

On opening the abdomen the tumor was found to comprise nearly half of the wall of the stomach; there was no marked glandular involvement or adhesions, and it was determined to remove the whole organ. The greater and lesser omentum were tied off and divided; the duodenum was clamped and a ligature was placed around it half an inch above the clamp, and the tissues

were divided between the two. The ends were washed in salt solution and wrapped in iodoform gauze. The same method was employed with the œsophagus and the cardiac end of the stomach. It was found that the œsophagus and duodenum could be brought together, and they were united by a Murphy button to shorten the operation, as the patient was growing weak. No Lembert sutures were applied, as the approximation was good. The peritoneum was closed by catgut suture and the abdominal incision by silkworm-gut. There was practically no loss of blood. The operation lasted two hours and a quarter, and was followed by a considerable amount of shock. The patient, however, made a complete recovery and was gaining in flesh and strength. The case was one particularly adapted to the operation, as the patient had been compelled to live on a semi-solid diet on account of her age and deficient teeth.

Excision of Carcinoma of the Sigmoid Flexure.—BARLING (*Birmingham Medical Review*, March, 1898) reports two cases in which he removed carcinomatous tumors from the sigmoid flexure. In the first case, a male, aged thirty-nine years, had been troubled for some time by constipation and difficulty at stool, which was relieved by laxatives. Examination under ether failed to reveal a tumor, but when he returned a year later it was readily detected. It was removed and an artificial anus was formed, which the patient preferred to have remain open. Recurrence following in a year, a further section of the bowel was excised and enterorrhaphy was performed. The patient died from an acute volvulus of the small intestine on the third day after operation.

The second case was in a pregnant woman, the tumor blocking the pelvic outlet. Its true nature was not diagnosticated till the tumor was exposed. The section of gut was excised and an artificial anus was formed. The patient recovered and bore a child at term. Recurrence took place in this case also, though at such a point that removal was impossible.

Primary Sarcoma of the Intestines.—SMOLER (*Prager med. Woch.*, 1898, No. 14), in discussing a series of thirteen cases of primary sarcoma of the intestines, says that they are always infiltrating in their character, affecting the entire intestine and increasing its size. They usually take up a considerable portion of the intestine. Histologically, they are usually sarcomata of mixed cellular type, though occasionally one sees a case that is lymphadenoid in character. Metastases are numerous and most frequently affect the lymphatic glands of the mesentery; in one case only were these glands not involved.

The part of the intestine attacked was in seven cases the ileum, twice at its lower end, three times the jejunum and ileum, and twice the cæcum. In one case there was in addition an adenosarcoma of the pyloric end of the stomach. Males were the subjects of the disease ten times; females three times. The majority of the cases were in the fortieth year.

The enlargement of the intestine, which is the general rule, the author believes, with Kraus, to be due to the destruction of the normal elasticity of the intestine by the sarcomatous infiltration and its dilatation from the pressure of the intestinal contents. This seems to be substantiated by the

fact that in the cases in which pyloric stenosis was present no marked increase in the lumen of the intestine was found.

That ulceration does not occur frequently is probably accounted for by the fact that dilatation is so commonly present.

The distention of the intestine in these cases must be considered as typical of this disease; this is also borne out by the clinical fact that these tumors, though large in size, may lead to the death of the patient without a symptom of stenosis having been manifested.

The Surgical Treatment of Cholelithiasis.—A series of obscure cases in which no biliary calculi were passed leads STEINTHAL (*Deutsche med. Wochenschrift*, 1898, No. 13) to give the following as some of the special diagnostic symptoms in certain forms of cholelithiasis:

1. Attacks of colic, either with or without icterus, when gallstones have been passed on previous occasions, indicate that there are multiple calculi present.

2. Attacks of colic, either with or without icterus, when there is positive evidence that no stones have been passed, indicates a large obstructing stone with or without other smaller stones.

3. Attacks of colic without icterus, when it is positively known that no stone has ever passed, make it probable that there is a large stone present in a diverticulum of the gall-bladder.

4. Attacks of colic without icterus, but with the passage of a large stone, point to an abnormal adhesion of the gall-bladder and bowel and the passage of the stone by ulceration.

5. If there is a rise of temperature accompanying the attack, suppuration is probable as a complication.

In all these conditions surgical intervention is indicated.

Post-typhoid Cholecystitis.—Recent advances in bacteriological research have shown that those usually called pyogenic cocci are not the only forms of bacteria that are capable of producing suppuration. IMHOFER (*Prager med. Wochenschrift*, 1898, No. 15) adds another case to those already reported in which bacteriological research has demonstrated the fact that cholecystitis may result from the infection of the biliary tracts by the typhoid bacillus. It has been shown that this sequela of typhoid may occur after a period of apparent perfect health and recovery from the disease. The period varies in length from two or three months to as many years, and even longer in perfectly authentic cases, where the diagnosis has been corroborated by bacteriological examinations. It has also been shown that biliary calculi may form with a mass of bacteria as their nucleus.

Liver Abscess.—POWELL (*Indian Medical Gazette*, February, 1898) makes a plea for the more accurate diagnosis and localization by laparotomy of surgical diseases of the liver. He shows that accurate diagnosis is impossible in any other way, and that the risks attendant upon aspiration or exploration by the trocar are very great and altogether unscientific and unworthy of the recent progress in surgery. Why should such procedures be employed in

disease of the liver when the diagnosis of disease in the pelvic viscera or of the appendix is regularly made by an exploratory laparotomy?

He proves the force of his remarks and the value of such exploratory laparotomies in these cases by detailing a number of successful operations which have been the result of interference based on this line of reasoning.

THERAPEUTICS.

UNDER THE CHARGE OF

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Ether Pneumonia.—Dr W. T. McCardie notes among prophylactic measures the turning of the head to one side during anæsthesia; the use of a small quantity of ether given with exact regulation by an inhaler, in preference to a large quantity given by a more open method, which results in greater chilling, irritating, and depressing effects on the air-passages; cleansing of the nasopharynx, nasal passages, mouth, and throat previous to etherization, which is not necessary in most cases; and noting the importance of coughs and colds as contraindications. It is advisable that the length of operations should be minimized, and that the surgeon should cultivate a dexterous speed in the interest of his patient. During and after operations unnecessary exposure of the patient should be carefully avoided, and during a laparotomy a hot-water chamber beneath and long hot-water bottles at the side of the patient will greatly lessen the danger of chill and depression of the vital powers. In treatment morphine and atropine have been recommended, but the former drug must be given with great care. Alkalies and expectorants are of great service for loosening secretions and stimulating excretion; otherwise the treatment is the same as in the ordinary forms of pneumonia.—*Treatment*, 1899, No. 22, p. 697.

[It is incredible that the mortality from ether-pneumonia can be as quoted in the paper—almost 50 per cent. If this is in any degree the truth, ether must never be administered to subjects already affected by respiratory or renal diseases. An extended experience in this form of pneumonia would indicate that morphine and atropine are absolutely contraindicated, and alkalies and expectorants have but extremely limited use. When death occurs—and it has been in much less than one-half the percentage quoted—it has been caused by right-heart paralysis. The remedies of most value are nitroglycerin and strychnine, and the dose adjusted to the necessities of the patient. Ether-pneumonia is a medical, not a surgical, disease, and requires prompt, scientific, and experienced treatment by a physician.—R. W. W.]

Oxycamphor.—Dr. Alfred Ehrlich presents this as remedy for dyspnœa in that it diminishes the irritability of the respiratory centre. This is not

obtained by direct oxidation of camphor, but by the replacing of a hydrogen atom by a hydroxyl group in the camphor molecule. It occurs as a colorless, crystalline powder, which when fresh is odorless, soluble up to 2 per cent. in cold water, but in hot water or alcohol is much more soluble. Its solution is almost tasteless or slightly bitter; is neutral in reaction, and in exhibition of fresh drug forms an absolutely clear solution. In the presence of light and moisture it readily changes its appearance and composition. Investigation as to the effect of this remedy upon the circulatory system and the temperature shows that its influence is not worthy of mention. To be sure, the pulse-rate diminishes to the extent of ten to twelve beats per minute, but this slowing may be accounted for by the improvement of respiration following its use. It may be administered as compressed tablets with sugar of milk, each containing four grains of the active substance. For administration, to avoid gastric disturbance, these tablets may be dissolved in hot water and given in solution with syrup. Better is the use of gelatin capsules. The daily amount may be as much as thirty grains. The instances of its use which are reported seem to confirm the statement made as to its properties. As a direct result of the relief of the dyspnœa, sleep is greater in amount and more restful.—*Centralblatt für die gesammte Therapie*, 1899, Heft i. S. 1.

Annual Report of the Loomis Sanitarium for Consumptives.—Dr. J. Edward Stubbert reports methods of treatment as follows: Antitubercle serum gives three marked results, viz., reduction of temperature, decrease of tubercle bacilli, and possible subsequent immunity. Its effects are not deleterious, a larger percentage of improvement follows its use than in the case of creosote, and, lastly, the moral effect on the patient is of value (?). This serum, however, has been discarded in all save incipient cases. Fischer's serum was tried in four cases and found unsuccessful. Hirschfelder's oxytuberculin was also given a trial, but such large amounts had to be injected that the patients rebelled, and it was abandoned. Antistreptococcic serum (Pasteur) was used in ten cases showing streptococci. The results were very gratifying. In eight of the patients the streptococci entirely disappeared, following one or two injections of the serum, for periods varying from a few weeks to a number of months. In one instance three injections were given without any effect. In the tenth case, curiously, tubercle bacilli disappeared, but streptococci remained present in large numbers. The author hopes that by the use of this anti-streptococcal serum the unfortunate complication of mixed infection (usually streptococcic) can be eliminated, and that thus the growths of pure tubercle bacilli can be combated more successfully with anti-tubercle serum. In laryngeal tuberculosis where ulceration was present, six patients were discharged healed, three improved, three stationary, and two worse. This is a better showing than those from the sanitarium in Colorado, where only 25 per cent. are discharged with ulcerations healed. Ichthyol is recommended in genito-urinary and intestinal as well as pulmonary tuberculosis. As much as one drachm in a day can be taken without gastric disturbance if keratin coated pills are prescribed. As a substitute, ichthalbin may be used; dose: one to one and a half drachms daily. Kalagua, a new South American drug, gave good results in six cases in which it was tried. Creosote was also used in about two dozen instances. The author objects to

it because of its harmful effects on the stomach, intestines, and kidneys. Guaiacol gives improvement in 75 per cent. of the cases. Oil of cinnamon caused improvement in the cases in which it was used; dose: thirty to forty minims. In sixty-one cases where hot-air inhalations were employed, forty-seven showed improvement in cough. Pneumochemic treatment is useful in excessive bronchorrhœa, but deprives the patient of three or four hours daily out of doors. Ozone and static electricity are beneficial as general tonic treatment.—*Philadelphia Medical Journal*, 1898, vol. iii. p. 155, No. 3.

[If cresosote had been employed as creosote carbonate, no digestive disturbance would have appeared. The discredit of the creosote treatment is the fault of the physician, not of the drug.—R. W. W.]

Reinforcement of the Bromides in Treating Epilepsy.—Dr. F. X. Dercum prefers ammonium bromide as the least depressing in its effects. Antipyrine associated with it increases its activity, so that when combined fifteen will often be found as efficacious as thirty or thirty-five grains if used alone, and no unpleasant effects follow. To help guard against the mental depression and eruption, various iodides may be used to advantage. Sulphonal is useful in preventing attacks of epilepsy at night. Five to twelve grains often cause a cessation of nocturnal seizures, and sometimes as a further result those during the day also. Another drug used with great success at times is acetanilid in dose of four to six grains after meals. This is thought to act as a germicide, and thus to prevent fermentation. It may influence the blood by clearing the alimentary canal of substances which if absorbed may vitiate it. It is known that when skatol and indol and other substances of like nature are plentiful in the system, the attacks are more frequent. In this way constipation always favors the course of the disease. Gastro-intestinal atony also contributes its effects. These considerations give reason for frequent bathing, exercise, and out-door life, which are so effectual in treating the disease, the excretion of these effete matters being thus aided.—*The Medical Fortnightly*, 1899, No. 1, p. 70.

[The fact that the bromides differ in their action according to the base is often lost sight of by neurologists. The author is quite correct in choosing the ammonium salt.—R. W. W.]

Accidents in Serum Injections for Diphtheria.—Dr. Sevestre, after praising diphtheria antitoxin, says albuminuria can appear after its use. It must be determined whether albumin was present before the injections or not. In the former case the amount of albumin increases slightly for five or six hours. Later it diminishes. On the whole, there is no unfavorable effect from the serum injection where there is no preceding albuminuria. It is hard to decide whether its subsequent appearance is due to the serum or to the original disease, namely, diphtheria. In any case it is of much less importance than has been thought. All things considered, post-diphtheritic paralyses are rather more common than formerly. The explanation probably is that there are more grave cases surviving under the present treatment, and, consequently, exposed to paralysis. The same can be said in cases of sudden death during convalescence. The serum treatment saves those most severely

infected, but it is useless for lesions once produced, especially where employed late in the disease.

Local accidents are: Erythema surrounding the puncture, and abscesses. The former, the cause of which is uncertain, disappears usually under twelve hours. Abscesses are solely the result of careless asepsis. Increase of fever ceases again very quickly. When it persists for several days, pulmonary tuberculosis is probably present. Erythematous eruptions and urticaria rarely appear on the first day, generally on the third or fourth, but sometimes they show themselves on the eighth or tenth day. They are due to the action of the serum as such, and apart from its antidiphtheritic properties, for in using other serums the same type of eruptions is found. They are of little importance.

Later accidents are: A progressive febrile movement, reaching 104° F., and so remaining for four or five days. At the same time appears a rather characteristic eruption, especially about the elbows and knees, and much like roseola. It is largely limited to the extremities. The rash is scarlatiniform in so far as it often begins on the abdomen and chest, and gradually involves the neck, face, and slightly the extremities. The rash appears as a polymorphous erythema finally, always selecting the extremities. Arthralgias occur late in serum treatment, and are wandering, sometimes appearing in one joint, and later in another; a slight febrile movement is often present. The articulations of the cervical spine are especially susceptible. The attack is sudden, and passes off in a few days. Adenitis of the groin, axilla, and neck often appears. This must be differentiated from the adenitis often present in scarlatina. A mucous diarrhœa, difficult to manage, is not uncommon, and with it excitation, even violent delirium. Antitoxin is to be injected as soon as diphtheria is suspected. In a very mild case twenty-four hours may elapse before the first injection is made, a culture being reported on in the meanwhile. In cases of mixed infection the serum treatment is also indicated. Only one real contraindication exists: in a tuberculous patient, when the sore-throat is mild, and the case would be aggravated because of the bad effect of the serum on a pulmonary lesion. The doses of antitoxin as given by the author would not apply in the case of other antitoxin units.—*Journal de Médecine*, 1898, Tome lxx. p. 12, No. 1.

The Treatment of Functional Disorders of the Liver.—Dr. Robert W. Burnett states that pies and pastry, strong soups, made dishes of all kinds, as curries, stews, hashes, entrées, much fat, and fatty foods, cured meats, with the possible exception of boiled or roasted bacon and dried fish, should be avoided. Also rich fish, such as salmon, mullet, mackerel, and eels; rich gravies, sauces, spices, pickles, condiments, new bread, hot rolls, muffins, hot buttered toast, rich cakes, and rich puddings; sugar and all sweets; jam tarts, jams, creams, ices, nuts, and dried fruits; raw vegetables; fruits rich in sugar, as pears, must be avoided. The less alcohol the better. Spirits, sweet champagne, Madeira, sherry, port, Burgundy, liqueurs, cider, ales, and stout are disadvantageous. Eggs, butter, cream, and even milk, must be taken sparingly. The same may be said of farinaceous substances generally, of potatoes, parsnips, and carrots. If alcohol is taken, claret and hock in very small amounts are the best. The quantity of liquid taken at meals should be small, but the daily amount of simple fluids should not be limited.

Free elimination is most desirable and, therefore, the patient should be encouraged to sip half a pint of hot water daily, about two hours after each meal, and also the last thing at night. Of spas recommended the types are Carlsbad and Homburg abroad and Harrogate and Strathpeffer in England. The use of some one of the aperient mineral waters at home is often helpful in connection with other treatment; these may be Alsculop and Apenta. Calomel or blue pills, either with or without the addition of euonymin or podophyllin, are undeniably useful in removing the signs and symptoms of disordered liver. If rapid and vigorous effect is required, two or three grains of calomel given in the evening and followed the next morning by a mild saline, as a drachm of sodium sulphate or two or three drachms of sodium phosphate in hot water, or a wineglassful of one of the aperient waters, will in most cases be followed by eminently satisfactory results. In a few instances the saline does not agree: it teases, gripes, and irritates. If this be so, a few capsules of castor-oil, or one or two drachms of the oil in hot milk, may be given in place of the saline in the morning, followed by a cup of hot tea or water. If a less rapid but more continuous action is desired, one-half grain of calomel, or one-half grain of blue pill with euonymin, iridin, or podophyllin, and extract of colocynth may be given. It is well to add extract of hyoscyamus, powdered capsicum, and oil of cajuput. This pill may be better, in some instances, if followed by a mild saline in the morning and repeated every second or third night for a week or ten days. Podophyllin is an excellent drug when it agrees, but even in small doses may sometimes cause much griping and discomfort. If this proves to be the case one-half to two grains of euonymin or iridin should be substituted. Mineral acids, especially nitro-hydrochloric, have been frequently advocated, but their results have been found to be disappointing. If the tongue is dry and furred, better results are obtained by use of the alkalies. Sodium or potassium bicarbonate with taraxacum and some aromatic, as compound tincture of cardamom, are often beneficial. Ammonium chloride, potassium iodide, and nux vomica must not be forgotten. Exercise in the open air may often be helpful. The activity of the skin must be increased and maintained. The occasional use of the Turkish bath and the warm bath, with plenty of rubbing, is beneficial.—*Treatment*, 1898, vol. ii. p. 661.

Oil of Wintergreen in the Treatment of Chorea.—Dott. H. Fornaca Luigi states that not only is this useful in rheumatism, but it is an antipyretic in erysipelas and scarlet fever with diphtheria, an antiseptic in tuberculosis and other chronic diseases of the respiratory system when inhaled, and when given internally in certain diseases of the kidney and bladder. The daily amount varies from one and one-half to two and one-half drachms when given by the mouth. Noting the rapid systemic effects when applied by inunction incorporated with an equal quantity of white vaseline upon a patient suffering from chorea, it was employed pure upon a second subject, to the daily amount of two drachms. Three cases are reported. It is beneficial not only when rheumatism is an important factor, but when no history of this is obtainable. The remedy is readily absorbed by the skin, showing its presence in the urine within six hours, yet not giving rise to any disturbance.—*La Riforma Medica*, 1898, No. 49, p. 578.

Indications for Digitalis.—M. POTANI calls attention to the vasomotor action of the drug, which is often overlooked; that with a rather generous dose, migraine due to cerebral congestion can be overcome, where a small dose, acting on the circulatory centre, would simply aggravate the condition. Diuresis is produced only in those cases in which there is anasarca, and is due to the anasarca; often there is diuresis without increase of blood-pressure. When the dropsy has disappeared the diuresis ceases. Diminution of the dose is indicated on disappearance of dropsy, for digitalis is then no longer well borne. Its cumulative action is mentioned; the chief indications are increased frequency and irregularity of the pulse and the presence of œdema. In cases the reverse of these it is useless or harmful. Special warning is given against its careless use in myocarditis with fatty degeneration and in cardiac asthenia with dilatation. In cardiac dilatation of gastric origin digitalis is harmful, for it is not tolerated by the stomach. Arterio-sclerosis is not a contraindication if caution is used. Where increased frequency of the pulse or dropsy is present in aortic insufficiency, digitalis is distinctly indicated. Usually these conditions do not exist. The same is true in mitral stenosis. In mitral insufficiency it has its widest use; wait before commencing, because it is late in the disease that digitalis is most needed. When tricuspid accompanies mitral insufficiency, the former, unless great care be taken, is made to disappear too rapidly by digitalis, and pulmonary apoplexy results, through increase of capillary pressure. Of the preparations, the powder is too often emetic and unreliable. Digitalin is preferable.—*Journal de Médecine*, 1898, Tome lxix , No. 23, p. 887.

[The vasoconstriction which is marked after long-continued use accounts for many symptoms generally ascribed to its "cumulative" effect. Fewer deaths from its use have been recorded since the practice of administering a nitrite has become better known.—R. W. W.]

The Use of Formalin for Sweating of the Feet.—DR. GERDECK paints the feet with a brush three times daily, using fifteen to twenty drops of the substance. Over the soles the brush should be carried four or five times, between the toes only once, and no application should be made over the dorsum. Four to six drops may be poured into the boots. The odor disappears, and, besides, the remedy is an excellent preservative of leather. The results last three to four weeks, when the treatment must be renewed. If excoriations are present a slight smarting sensation is produced, which, however, does not prevent walking the next day. The remedy acts as a deodorant, and is not toxic. The skin becomes dry as leather and does not sweat. The suppression of the sweating—according to observations made upon soldiers—appears to be without influence upon the general health.—*La Riforma Medica*, 1898, No. 38, p. 455.

Treatment of Ophthalmia Neonatorum.—DR. L. WEBSTER FOX warns that drastic measures are essential if the cornea assumes a yellowish appearance on eversion of the lid, else perforation is likely to follow. Here a 1 per cent. solution of silver nitrate should be applied to the palpebral conjunctiva, and this followed during the day with a 1 to 5000 solution of sublimate. The mucous membrane must be dried and the pus removed by applying this

solution upon a pledget of cotton. The edge of the lids should be anointed with an ointment of yellow mercuric oxide in petrolatum, 1 to 500. The *cul-de-sac*, up and about the retrotarsal fold, should be thoroughly irrigated. If there is tumefaction of the eyelids, impairing the nourishment and circulation of the cornea after the fourth or fifth day, apply a solution of eserine [physostigmine] sulphate in rose-water, 1 to 250, in addition to the above treatment, when decrease of suppuration will be observed. No favorable results have followed the instillations of atropine. The cornea has not been saved after cloudiness has appeared. If the conjunctiva becomes thick and velvety, strong silver nitrate solutions should be applied. Scarification or application of zinc sulphocarbolate may be useful. Recently good results have followed the application of a 50 per cent. solution of protargol.—*The Medical Bulletin*, 1899, No. 2, p. 41.

Stypticin.—Dr. Bossi finds that this remedy [cotaraine hydrochloride] is a uterine hæmostatic without possessing ecbolic properties. He concludes that (1) this is for animals less toxic than the fluid extract of hydrastis, and in patients has not produced any disturbances worthy of mention. (2) Administered to pregnant animals and in gravid women it is not ecbolic. (3) In some instances of pregnancy with threatened abortion, beside a decided hæmostatic action, there is noticed a marked sedative effect upon the uterine muscles similar in part to that of viburnum and explicable by the fact that this substance is analogous to a product of the decomposition of narcotin. (4) For all that its hæmostatic action may not as yet be assumed to be superior to that of hydrastis, it should be considered useful in practice (*a*) in alternation with hydrastis for long-continued use; (*b*) as a substitute when only poor preparations of hydrastis can be obtained, or in idiosyncrasy, or when hydrastis is not well borne by the patient; (*c*) in association with viburnum and piscidia, or alternating with these remedies, in case of threatened abortion with hemorrhage. (5) This remedy can be used by midwives as a hæmostatic without ecbolic properties, and thus do away with the exhibition of ergot.—*La Riforma Medica*, 1898, No. 35, p. 114.

Tuberculin in the Treatment of Lupus.—Dott. Michele Brocchieri has made an exhaustive study of the tuberculins. Of especial interest are his conclusions in regard to tuberculin T. R. in the above disease. They are: 1. It acts without producing marked disturbances. 2. It resolves the infiltrations of lupus. 3. To determine accurately all that it can accomplish a year is necessary. 4. It limits the diffusions of the process, as if immunizing the surrounding parts. In the instances reported tuberculin has failed, while the use of tuberculin T. R. was successful.—*Il Policlinico*, 1898, No. 21, p. 489.

Potassium Iodide in the Treatment of Submucous Fibroids.—Dott. N. Marini has obtained satisfactory results by injecting into the uterine cavity a 10 per cent. solution of this substance in sterilized water or glycerin, and following with gentle massage of the uterus for five minutes. The hemorrhage ceases, the tumor diminishes in size, the pain lessens, and the general condition improves.—*Gazetta degli Ospedali v della Cliniche*, 1898, No. 142, p. 1503.

GYNECOLOGY.

UNDER THE CHARGE OF
HENRY C. COE, M.D.,
OF NEW YORK.

Senile Changes in the Fallopian Tubes.—SCHNAPER (*Centralblatt für Gynäkologie*, 1898, No. 44) describes the histological changes in twenty specimens removed from women whose ages ranged from forty-seven to ninety years. The ciliated columnar epithelium seen in the tubes of women before the climacteric gradually disappears, being ultimately replaced by cells of an endothelial type, which are eventually cast off, forming collections at the ends of the tubes and between the mucous folds. The mucosa is invaded by young connective tissue, while outgrowths resembling granulation tissue are seen at the spots where the epithelium is absent. Adjacent outgrowths may be connected by processes of connective tissue, forming closed cavities like alveoli, which on superficial inspection might be mistaken for glands. Through an increase in these adjacent processes the folds in the mucosa may be obliterated, the connective tissue becoming firm and hard.

The writer compares the condition to senile colpitis, since in both there is a gradual loss of the superficial epithelium, succeeded by a development of connective tissue, leading to narrowing or even to complete closure of the canal.

The muscular layers undergo atrophy until, in some cases, only islands of muscle tissue remain, the wall of the tube being more or less diminished in thickness. The adventitia of the vessels undergo similar changes, with consequent contraction of their lumina.

Results of Treatment with Ovarian Extract.—SEELIGMANN (*Allgem. med. Centralzeitung*, 1898, No. 3) reports fifteen cases treated by extract of the ovaries of sheep and pigs. He divides these into two classes, those in which the ovaries had been removed and those in which various disturbances attended diminished ovarian activity, both in young women and in patients at the climacteric.

The writer decides that the remedy has a decidedly beneficial action not only upon typical climacteric phenomena, but also upon the psychical depression and constitutional affection (such as gout and psoriasis), which, after long remaining latent, develop at the time of the menopause. In three cases of Basedow's disease the effect was quite marked. From chemical analysis of human ovaries he is led to the conclusion that it is not improbable that an iodine compound, like iodothyrin, may be isolated from the ovary.

Vaginal Cysts.—STOKES (*Johns Hopkins Hospital Reports*, 1898, Nos. 1 and 2) divides cyst of the vagina into three classes, viz., inclusion-cysts, those developing from embryonal tissue, and retention-cysts of glandular origin.

The first variety are of traumatic origin, due to the inclusion of islands of undenuded mucous membrane during plastic operations. They are small, globular, and contain a thick fluid filled with cast-off epithelial cells. They are seldom of any clinical interest. Embryonal cysts, which develop from the Wolffian ducts, are usually lateral in their situation, of an elliptical shape, and may reach a large size, giving rise to well-marked pressure-symptoms, dyspareunia, or even dystocia. Their contents are watery, with only a few cells, their walls being quite thin and semi-transparent. Retention-cysts develop from occluded glands, their walls consisting of gland-tissue, with an inner lining of ciliated columnar epithelium, which may lose the cilia and become flattened as the result of pressure. They contain a clear fluid in which are a few cells. Enucleation of the entire cyst is desirable whenever possible.

Dermoids of the Pelvic Connective Tissue.—QUERVAIN (*Archiv für klin. Chirurgie*, Band lvii., Heft 1) describes a retro-rectal dermoid cyst in a man, which for several years had given rise to severe vesical symptoms. It was drawn upward, sutured in the abdominal wound, drained, and later removed.

Only fifteen similar cases have been reported, all in women. They may be divided into two classes, viz., dermoids beneath the levator ani (between the rectum and the coccyx), and those above the levator, the latter being situated in the retro-rectal connective tissue, in the subserous tissue between the peritoneum of Douglas's pouch and the levator, or in the broad ligaments. The symptoms are due to pressure on adjacent organs and vessels. Those in front of the rectum must be distinguished from tumors in the cul-de-sac; dermoids behind the rectum may be mistaken for cold abscesses, serous or echinococcus cysts, explorative puncture being often the only means of establishing the diagnosis, although this procedure is not free from danger. It is better to operate as soon as the character of the neoplasm is recognized. Incision and drainage are recommended only when the tumor is first discovered during labor, and it should be extirpated as soon as possible after delivery.

The method of operation depends upon the situation of the dermoid; if it extends downward, perineotomy is indicated; if it is high up, the parasacral incision is better. If the tumor is abdominal, either of these methods may be combined with the extraperitoneal abdominal.

Appendicitis Simulating Neoplasms.—LEGUEN and BEAUSSENAT (*Revue de Gynécol. et de Chirurgie Abdom.*, 1898, No. 2) call attention to anomalous cases of appendicitis which may be mistaken for neoplasms in the iliac fossa. In these a hard tumor develops slowly, with progressive emaciation and cachexia. After a long period the mass becomes softer, evidences of suppuration appear, and on making an incision pus is evacuated, the tumor then disappearing. Eight cases are reported, with references to others in literature.

Transplantation of Ovaries.—ARENDT (*Centralblatt für Gynäkologie*, 1898, No. 41) reviews the experiments of Knauer and Grigorieff, which apparently showed that ovaries transplanted upon the broad ligaments preserved their full functional activity, as shown by the subsequent occurrence

of pregnancy in four cases. With the technique which they adopted he argues that it was impossible to avoid leaving portions of the ovary in the stump.

In his own experiments (fifteen in number) he not only transplanted ovaries upon the broad ligaments in the same animal, but from one rabbit to another and from a rabbit to a cat.

The greatest care was employed to remove both ovaries entire, and that this was done was proved by subsequent atrophy of the genitals. On killing the rabbits within three months after operation the transplanted ovaries, as well as the uterus and tubes, were always found to be atrophied.

Ligation of the Uterine Arteries.—MANGIN (*La Gynécologie*, October 15, 1898) reports fourteen cases, from which he makes the following deductions: 1. Ligation of the uterine arteries is a simple operation, devoid of danger, and can be performed without anæsthesia. 2. It is especially indicated in cases of obstinate menorrhagia which resist medicinal treatment and curettement. 3. After ligation of the arteries hemorrhage nearly always ceases, and fibroids often undergo atrophy, especially when these are situated in the lower uterine segment. 4. The only contraindication to the operation is disease of the adnexa.

Smooth Muscle-fibres in the Broad Ligaments.—BLUMBERG and HEYMANN (*Archiv für Anat. und Physiologie; Centralblatt für Gynäkologie*, 1898, No. 46) describe the arrangement of smooth muscle-fibres in the broad ligaments of the fœtus in man and mammals as found in extended observations. They state that in the embryo these muscular bands assist in the descent of the ovaries by fixing these organs during the growth of the body. After birth they assist in supporting the genital organs. The round ligaments are actively concerned in keeping the uterus in its normal position. The infundibulo-pelvic and infundibulo-ovarian ligaments support the ovary and tube in common, the ovarian ligament the ovary alone; the latter also insures the entrance of the ovum into the tubes.

Primary Carcinoma of the Fallopian Tube.—DORAN (*Transactions London Obstetrical Society*, 1898) has collected all the published cases—twenty-three in number—in twenty of which carcinoma developed in a tube which presented no other evidences of disease. In three cases the disease probably extended to the ostium from an adherent ovarian cyst that had undergone malignant degeneration. One patient was free from recurrence seven years after operation, four being alive from one to one and one-half years after, while all the rest died within a year after extirpation of the affected tube.

The Condition of the Tubes During Menstruation.—BOND (*British Medical Journal*, June 4, 1898) found a bloody fluid in five healthy Fallopian tubes removed during menstruation, which showed, under the microscope, red and white blood-corpuscles and epithelial cells in various stages of mucoid degeneration. Sections through the uterine ends of the tubes were marked by thickening of the folds of mucosa with round-cell infiltration, though without exfoliation of the epithelial lining. In a case in which

menstruation had ceased twenty-four hours before, the uterus contained bloody mucus, while none was present in the tube—a fact which seems to prove that menstruation begins in the tubes.

Bond inferred from experiments on animals that the escape of blood into the tubes is a true menstrual flow and not the result of ordinary venous obstruction. In cases of hydrosalpinx the increased pressure may prevent the usual monthly hemorrhage.

Torsion of the Fallopian Tube.—LEGNEU and CHABRY (*Revue de Gyn. et de Chir*, 1898, Nos. 1 and 2) regard this as a rare condition, only three authentic cases having been reported by Sutton, Delbet, and Hartmann and Reymond—all hydrosalpinx. The present writers describe a fourth case, in which the tubal enlargement was a large hæmatosalpinx. In this instance the tube alone was twisted around its long axis, the ovary remaining in its normal position. The cause of the torsion is not clear; it causes a complete occlusion of the lumen of the tube.

Fibroma of the Tube.—JACOBS (*Revue Internat. de Méd. et de Chir.*, 1898, No. 8) adds another case of true fibromyoma of the Fallopian tube to the six already reported. The growth was as large as an orange, submucous, and sprang from the middle third of the tube, the lumen of which was greater than normal and the distal end hypertrophied. Sections showed that the tumor developed from the muscular layer.

PARET (*Thèse de Paris;* abstract in *Centralblatt für Gynäkologie*, 1898, No. 46) states that fibromata of the tube are quite rare, and may undergo torsion of their pedicles with the same results as in the case of ovarian neoplasms.

Electricity in the Treatment of Anal Fissure.—DOMNER (*Journ. de méd. de Bruxelles*, 1898, No. 3) speaks highly of the use of the galvanic current in cases of anal fissure with hemorrhoids. One electrode is inserted beyond the sphincter, and the sitting is not prolonged beyond five minutes, from two to four applications being sufficient to cure old cases which have resisted the ordinary methods of treatment. The dosage is not given.

Hydrastine Hydrochlorate in Uterine Hemorrhage.—ROUSACK (*American Medical and Surgical Bulletin*, 1898, No. 3) highly recommends this alkaloid in the treatment of menorrhagia as well as of hemorrhages following abortion and labor at term. Excellent results were obtained in cases of menorrhagia associated with uterine displacement and disease of the adnexa. In one case of hemorrhage during pregnancy the bleeding was stopped and the patient went on to full term. Hemorrhages due to the presence of fibroid and malignant growths are not affected by the drug.

When large doses were administered to animals a cumulative effect was observed, shown by increased irritation followed by paralysis. Therapeutically, the daily dosage varies from one and one-half to two grains.

Adenomyoma of the Uterus.—IVANOFF'S inaugural thesis upon this subject (*La Gynécologie*, December 15, 1898) is based upon an examination of seventy-seven fibromyomata of the uterus, the majority of which were of the

subserous variety. He was able to find glandular elements in only a single case, hence he concludes that uterine adenomyoma is very rare. He does not believe that embryonic remains which have been present for many years in the uterus can suddenly develop into a fibro-muscular neoplasm.

In the specimen examined a zone of irritation was present around the epithelial tubes and cystic cavities, as shown by dilatation of the vessels and round-cell infiltration, the same as in cases of localized obstruction of the circulation.

Influence of Pregnancy on Ovarian Cysts.—GOTTSCHALK treats of this subject in a clinical lecture (*Frauenarzt*, November, 1898) based on the following case: A patient, aged forty years, had an ovarian cyst which two surgeons had declined to remove. She passed through pregnancy and labor normally, but on the second day after delivery developed symptoms of peritonitis, which subsided in the course of a fortnight. Nine weeks later she had a more severe attack, and cœliotomy was performed successfully. The cyst was firmly adherent to the intestines, the pedicle was twisted twice around its axis, and the sac was filled with pus and foul-smelling gas. A pelvic abscess further complicated the case. Pure cultures of the colon bacillus were obtained from the cyst-contents.

The writer's deductions are that extensive adhesions may develop during pregnancy as well as after delivery. Torsion of the pedicle may follow the emptying of the gravid uterus in consequence of the sudden change in the intra-abdominal pressure. Infection of the cyst during the puerperium is well known, Zetter having reported twenty-one cases.

Spontaneous Separation of Uterine Fibroid.—MADLENER (*Monatschrift für Geb. u. Gyn.*, December, 1898) reports a case of ovariotomy in which a fibromyomatous tumor the size of a walnut was found attached to the abdominal end of the tube and the broad ligament by long, thin adhesions. Three similar subperitoneal growths were seen on the uterus. The tumor was partially calcified. It was evident that it had been a subperitoneal fibroid that had become adherent to the tube and broad ligament, and as the latter was drawn outward by the growth of the cystoma the fibroid was detached from the uterus. Eleven similar cases have been reported.

Removal of the Other Ovary in Ovariotomy.—THEILHABER (*Ibid.*) lays down the following rules: If the opposite ovary contains only a few retention-cysts it may be left after puncturing or resecting the cysts. If the cyst is of the true papillomatous variety the other ovary should always be removed, even if it appears to be perfectly healthy, since experience has shown that it often undergoes papillomatous degeneration afterward. This does not refer to cases in which small excrescences are found in the inner walls of retention or parovarian cysts. Commencing adenomatous degeneration of the opposite ovary may be suspected if the albuginea is much thickened and the organ is almost entirely transformed into large cysts with thick walls. In the case of young women a suspicious ovary may be split open, its interior examined, and, if healthy, may be sutured with catgut. If one ovary is affected with carcinoma, sarcoma, or endothelioma, the opposite one should always be extirpated.

OBSTETRICS.

UNDER THE CHARGE OF

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The Treatment of Intraligamentary Pregnancy by Vaginal Incision.—At a recent meeting of the Obstetrical Society of London, DONALD (*British Medical Journal*, January 14, 1899) read a paper on a case of ectopic gestation at the seventh month in which the fœtus was extracted by vaginal incision. When admitted to the hospital the abdomen was enlarged by a tumor reaching four inches above the umbilicus. A large souffle was distinctly heard. The cervix was close to the pubes, and the uterus was somewhat enlarged. The post-vaginal fornix was bulged by a hard mass which almost filled the brim. This was the fœtal head, and its sutures could be outlined.

Abdominal section was performed and the placenta found in such a position that its removal was not safe. Accordingly the wound was closed and the child delivered by incision through the vagina and by crushing the head. The sac was packed through the vagina with iodoform gauze. On the fourth day this gauze was removed, when alarming hemorrhage occurred, which was checked with difficulty. The placenta was some weeks in coming away, but was finally delivered, the patient making a complete recovery.

In discussion, Galabin and Cullingworth spoke in favor of the combined operation, first making an abdominal incision to confirm the diagnosis, and then removing the embryo through the vagina. Galabin had removed the placenta in one case through the vaginal incision three days after the operation, and the patient rapidly recovered.

Donald ascribed the source of the hemorrhage to a placental vessel, which was disturbed when the gauze was removed.

The Serum Treatment of Puerperal Septicæmia.—GRIMSDALE (*British Medical Journal*, January 14, 1899) reports the case of a patient who developed streptococcus infection forty-eight hours after labor. Although the uterus was promptly cleansed, she rapidly developed serious symptoms. On the ninth day streptococci were found in the blood, and serum injections, two in number, were made. The patient's temperature fell to normal for twenty-four hours, and then rose gradually. The germs, however, were still found in the blood. Injections were given consecutively for fifteen days until the germs disappeared, when they were stopped. At this time the temperature was 101° F., but gradually fell, and the patient was discharged cured. No uterine treatment was employed, and no drug except quinine. Urticaria and severe pains in the limbs occurred, which disappeared in two weeks.

Cæsarean Section in the Philippines.—In the *British Medical Journal*, January 14, 1899, LOBTI gives some interesting information regarding obstetric practice in the Phillipine Islands. There is a religious prejudice against craniotomy, and Cæsarean section is often done after the death of the mother. Some remarkable statements are made as to the survival of children extracted several hours after the mother's death.

Dermoid Cyst Complicating Pregnancy Removed Through the Vagina.—In the *Transactions of the Obstetrical Society of London*, 1898, vol. xl., Part iii., ROUTH reports the case of a primipara, four months pregnant, who had an impacted dermoid cyst in the pelvis. The tumor was removed by opening the posterior wall of the vagina with a crucial incision, and separating the peritoneum by the fingers, drawing it down, and opening it. This gave the operator a tube of peritoneum through which to work. The cyst was then seized and a few adhesions separated. It was punctured, liquid fat escaping. It was then drawn down and found to have a short pedicle which could not be reached until the uterus was also depressed. A ligature was applied and a pedicle made. The patient recovered well and was just about to go home when her temperature rose to 106°. This was followed by abortion, from which she gradually recovered. There was no evidence of sepsis in this case.

Acute Bedsore Following Parturition.—BLACKER reports, in the *Transactions of the Obstetrical Society of London*, 1898, vol. xl., Part iii., the case of a multipara, aged twenty-six years, who had a perfectly normal labor until the end of the second stage. There was considerable hemorrhage after birth, and the placenta was removed by hand. During the labor, to relieve the pains, the lower part of the back was supported by the knee of an attendant for about an hour. The skin over the sacrum was red.

On the first day after confinement the skin over the sacrum was found to be bruised over an area three inches by two, which was surrounded by small vesicles filled with watery fluid. On the second day, a slough seemed forming and the skin over the left trochanter was also reddened. On the third day a small sinus formed, leading down to the sacrum, and the whole of the bruised area sloughed in the next few days.

When the patient was admitted to the hospital the slough was offensive, and the greater part of it was readily removed. There was a purulent discharge from the cervix, but not other evidence of pelvic disease. There was no evidence of injury to the vagina or cervix and no exudate in the pelvis. There was no paralysis or rigidity of the lower limbs and no loss of sensation. In two months' time the patient made a good recovery. No symptoms of nervous disease or of specific infection could at any time be observed.

A Simple Method for Securing Asepsis in Tamponing the Uterus.—In the *Centralblatt f. Gynäkologie*, 1898, No. 36, SCHWARZENBACH calls attention to the difficulty experienced in avoiding the contamination of gauze in tamponing the puerperal uterus. A considerable portion of such cases show rise of temperature during recovery, from infection obtained in this way. To avoid this, Schwarzenbach has devised a metal speculum, 10 cm. long (3.9 inches) and funnel-shaped. This speculum, perfectly smooth, can be steril-

ized by boiling and can be readily introduced. With this speculum he uses two tenaculum forceps, each of which has upon each branch a small hook, the point of the hook looking toward the distal end of the forceps. When the speculum is introduced, the anterior and posterior lips of the cervix are grasped by the tenacula forceps and drawn down so far that the hooks upon the forceps catch upon the rim of the speculum. In this way the womb is retained in position. The gauze can then be introduced through the speculum without coming in contact with the patient's tissues until it reaches the uterus.

Symphysiotomy Followed by Urethral Fistula.—CARR reports, in the *American Journal of Obstetrics*, October, 1898, two cases of symphysiotomy. The second was that of a white primipara in very delicate health, who had a long and difficult labor. Forceps was tried without success. When operated upon the patient was in a very critical state. Symphysiotomy was readily done, and a dead child delivered. A silk suture was placed in the pubic ligament and the bones drawn together. The patient suffered after operation from severe capillary bronchitis.

On the twelfth day a small opening appeared in the scar, through which urine began to discharge, and this opening finally became as large as the finger-tip. The sinus seemed to open into the urethra near the neck of the bladder. The silk ligature in the anterior pubic ligament was discharged through the sinus. This fistula finally closed in about four weeks. The patient's further recovery was complicated by phlegmasia dolens. At the end of seven weeks the bones were firmly united, and by the tenth week the patient could walk.

Two Cases of Ectopic Gestation Near Term.—In the *Centralblatt f. Gynäkologie*, 1898, No. 37, WARSAWSKI reports, from the clinic at Warsaw, two cases of ectopic gestation upon whom operation was performed.

The first was that of a woman aged thirty-three, married for thirteen years, who had never had a child. For the relief of dysmenorrhœa, dilatation and curetting of the uterus were performed. Shortly after, symptoms of pregnancy appeared and false labor came on, lasting at intervals for two weeks. There was hemorrhage for two days. After this, menstruation gradually returned. The patient was admitted to the hospital, and upon examination an ectopic pregnancy was found. The fœtus had perished, and the fœtal sac was evidently a rudimentary horn of a double uterus.

On abdominal section the diagnosis was confirmed, and the fœtal sac found in the left tube projecting into Douglas's pouch. It was impossible to separate the placenta without severe hemorrhage, and accordingly the membranes were stitched to the edges of the abdominal incision and the sac packed with gauze. The patient made a good recovery.

The second case was that of a woman who had previously had an abortion caused by a kick in the abdomen. After this abortion she again became pregnant and supposed herself in a normal condition. Fœtal movements, however, ceased. There was a bloody discharge, and the patient suffered from pain in the back and a feeling of weight in the abdomen. Operation had been proposed, but declined. On examination the uterus was found enlarged and empty. The fœtus had perished and the fœtal sac could be traced to the

rudimentary horn of a double uterus. This diagnosis was confirmed by abdominal section and a macerated child was removed. The placenta was parchment-like and was separated without bleeding. The fœtal sac filled Douglas's pouch.

After removing the placenta the sac was packed with gauze and brought out at the lower end of the abdominal incision. The patient made a good recovery, portions of the fœtal appendages coming away gradually for some time.

Induction of Abortion by Nitrate of Silver.—In the *Prager medicinische Wochenschrift*, 1898, No. 45, PEARLSEE reports his results in the therapeutic induction of abortion by the use of nitrate of silver. He introduced a small portion of the solid nitrate within the uterus, allowing it to remain and dissolve there. He saw no bad results from the use of this method.

Diabetes Insipidus and Pregnancy.—VINAY (*Lyon Mèdical*, 1898, No. 48) reports two very interesting cases of diabetes in pregnant women.

The first was a neurotic subject, who, after intense emotion caused by fright, had polyuria. She became afterward pregnant, when this symptom lessened. She went to normal labor, and was apparently making a good recovery, when, upon the thirteenth day, she had double pulmonary embolus and died from cardiac complications on the twenty-ninth day after her delivery.

His second case was one in which diabetes began at the fourth month of pregnancy. The immediate cause was intense mental shock following the burning of a portion of the patient's dwelling. The patient lost weight very greatly during her pregnancy, but went to term, and was spontaneously delivered of a living child, which died two weeks after birth. After her delivery the patient apparently did well until five months had elapsed, when symptoms of pulmonary tubercle appeared, from which she died.

It is very interesting to note that in both these cases profound mental shock was the immediate cause of the diabetes. The recovery of one of the patients was interesting and an exception to the rule in these cases. Pronounced diabetes is very fatal to mother and child as well.

Autointoxication in a Pregnant Patient Followed by Fatal Vomiting.—In the *Semaine Mèdicale*, 1898, No. 57, BARTH reports the case of a young woman in the second month of pregnancy who developed fatal pernicious vomiting and also embolism of the femoral artery. She was tuberculous, and alcoholic and atheromatous.

On post-mortem examination the womb was normal in size, shape, and position. The liver, however, showed old and chronic lesions, tubercular in origin; the kidneys were in a condition of recent degeneration; the affected artery was atheromatous; the stomach was normal, and the brain was also normal. The case is an interesting example of the effects of autointoxication in producing pernicious vomiting.

Double Ovariotomy During Pregnancy.—In the *Prager medicinische Wochenschrift*, 1898, No. 48, FISCHEL reports a very interesting case in which

a patient three months pregnant was found to have double ovarian tumor. She consented to operation, and the tumors, which were dermoid, were readily removed. She went to term and was delivered spontaneously of a living child. She made a good recovery.

This should strengthen the opinion of those who believe that ovarian tumors in pregnant women should be removed. It is interesting to note that 30 per cent. of ovarian tumors occurring in pregnant patients are dermoid.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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Morbid Growths of the Larynx.—Dr. Collins reports from the clinic of the Polyclinic Hospital (*Philadelphia Polyclinic*, 1898, No. 37) a case of recurrent growth, presumptively papilloma, which disappeared under the influence of ten-grain doses of magnesium sulphate three times a day, without any other treatment.

Rare Cases of Laryngeal Polyps.—Dr. Louis Bar, of Nice, reports (*Annales des Maladies de l'Oreille, du Larynx*, etc., September, 1898) cases of the following character: Intraglottic fibroma in a woman sixty-five years of age; fibroma of the right vocal band in a woman thirty-five years of age; papilloma of the interarytenoid region in an adult male, with subsequent history indicating possible transformation into epithelioma; cysts of the vocal bands in a female twenty-five years of age; fibromyxoma of the left vocal band in a man thirty-two years of age, and lipoma of the subglottic region in a woman twenty-five years of age.

Thyroidectomy.—Dr. Wm. Krusen reports (*Therapeutic Gazette*, August 15, 1898) a case of thyroidectomy in a German housekeeper, fifty-three years of age. The hypertrophied gland, about the size of an orange, on the right side of the trachea, extending laterally beneath the sternomastoid muscle and downward into the supraclavicular space, was freely movable beneath the skin, and apparently semicystic in character. The operation was successfully performed under oxygenated chloroform, some difficulty occurring by interference of the respiration by the tugging of the trachea during enucleation. The patient left the hospital on the eighteenth day, and the subsequent history has been satisfactory.

[In a successful thyroidectomy, under chloroform anæsthesia, recently performed by the compiler for a round-celled sarcoma occupying the same relative position as in the case reported above, there was a sudden change of

voice to a higher pitch, occurring upon the second day after the operation, although the recurrent laryngeal nerve was seen to be intact before the wound was closed. After convalescence the vocal band of the side operated upon was found immobile in the median position, there having been, in all probability, some adhesive inclusion of the recurrent laryngeal nerve in the cicatrization of the tract of the wound.]

Chronic Abscess of the Soft Palate.—Dr. Georges Laurens reports (*Annales des Maladies de l'Oreille, du Larynx*, etc., September, 1898) a case in a man forty-eight years of age. He was subject every seven or eight months to sudden access of extremely fetid odor in the mouth, with the expulsion of yellowish-white pultaceous matters, which were horribly fetid. [These were evidently decomposed excretions such as are frequently expelled from the diseased tonsils.] These phenomena would be produced several times a day for forty-eight hours, when they would cease. They were increased by compressing the submaxillary region. On one of these occasions, when examined by Dr. Laurens, a probe was passed into the supratonsillar fossa and penetrated into the tissues of the soft palate in two directions—one upward, the other downward and forward. A sort of a pre-tonsillar recess was thus defined between the anterior pillar and the tonsil, which latter were adherent one to the other. The probing gave exit to caseous pus of a most disgusting odor. On examination with a small mirror the pocket was seen to be normal in color and free from fungosities. Pressure externally at the region of the angle of the jaw gave exit to casefied pus in the neighborhood of the supratonsillar angle. The treatment consisted in making a free opening of the purulent region, with excision, scraping, and cauterization of the morbid tissues.

The author concurs in the opinion of de Lermoyez and Cartaz in considering these chronic abscesses as relics of profuse inflammations which have produced diverticula and fistulous passages.

Foreign Body in the Œsophagus.—Dr. Charles A. Powers, of Denver, Col., reports (*Boston Medical and Surgical Journal*, July 7, 1898) two interesting cases of successful external œsophagotomy for impacted foreign body. The first was for a triangular fragment of bone in a man, aged fifty years; the other for a wheel from a toy railroad car in a male infant, aged two and one-half years. In the latter case the diagnosis had been confirmed by skiagraphy; the operation was performed on the twenty-second day after the accident.

Deviations of the Nasal Septum.—A new and ingenious operation is described by Dr. E. B. Gleason (*Philadelphia Polyclinic*, 1898, No. 34). It consists in sawing a U-shaped flap around the deviation, base upward, then pushing that flap upward into the unobstructed passage so as to break the resiliency of the cartilage, and then allowing it to drop down over the opening like a trap-door. It is stated that no support by pins or tubes has been required in fully 8 per cent. of the cases.

[In one of Dr. Gleason's patients seen by the compiler the result was very satisfactory.]

Lymphoid Growths—The Influence of Adenoids upon the Development of Certain Lesions of the Skeleton—M. BILHAUT has proved (*Gaz. Hebd. de Méd. et de Chirurgie*, 1898, No. 52) that voluminous adenoids are very frequently found in the bodies of scoliotic subjects, and he believes that it is proper to consider that there is a relation of cause and effect between the two morbid conditions, especially because, in some cases of commencing deformation without definitive lesions of the skeleton, the removal of adenoids is alone sufficient to produce a cure. In more serious cases the removal of the adenoids should constitute the first therapeutic act, and then the effect of the orthopedic corset is incomparably more satisfactory than if it is applied without attention to the rhinopharynx.

M. Bilhaut also believes that the hour-glass deformity of the thorax described by Dupuytren is the result of trophic changes due to microbic infection of primitive adenoid localization.

Practical Point upon the Action of Cocaine.—PROF. SCHIFFERS, in a contribution upon the study of the action of cocaine (*Annales des Maladies de l'Oreille, du Larynx, etc.*, February, 1899), refers to the fact of the difference of susceptibility in different patients and of the same patient on different occasions. He finds that this is due sometimes to acidity of the solution itself, sometimes to the acidity of the mucous membrane upon which it is applied, and sometimes to acidity of the patient's stomach.

In any of these conditions the addition of an alkali will neutralize the acidity and will enable the application of cocaine to be effective in much smaller doses, sometimes amounting to one-half the strength. In cases of dyspeptics he would give alkaline waters in large doses. He would use only extemporaneous solutions of cocaine, and if these were acid he would neutralize them with a few drops of sodium carbonate or sodium bicarbonate.

Adenoma of the Soft Palate.—DR. W. L. BULLARD, of Columbus, Ga., reports (*New York Medical Journal*, December 10, 1898) a case of adenoma of the soft palate in a mulatto woman, aged twenty-three years, who had noticed the growth for some two years. At the time of consultation it was the size of a guinea-egg, and rendered sleep difficult on account of the impairment of respiration. It also troubled her in speaking and in swallowing. It was readily removed by enucleation, after incision into the mucous membrane, under chloroform. The breathing became so stertorous during the operation, on account of the paralysis of the palate, that it seemed alarming, and it was deemed advisable to introduce a catheter in the throat.

[If the compiler's memory serves him correctly, the majority of cases of adenoma of the soft palate occur in females.]

A Case of Pure Nasal Aprosexia without any Auditory Complications.—DR. GUYE, of Amsterdam, reports (*Annales des Maladies de l'Oreille, du Larynx, etc.*, February, 1899) the case. Prof. Guye proposed the term of nasal aprosexia to impaired cerebral activity due to nasal trouble and characterized by impossibility to fix the attention upon a determinate object, and attributed it to restraint in the escape of the cerebral lymph by the lymphatic passages of the nasal mucous membrane. Titeff and others claim

that the term auditive aprosexia is more appropriate, because the malady is associated with impaired hearing. The case reported with normal acute hearing proves the contrary.

A boy, aged eight years, had always slept with his mouth open, and was unable to learn anything at school. Not the slightest deafness had been observed either at home or at school. He had had an intermittent discharge from the right ear, and showed an old, dry perforation of the tympanic membrane; but he heard the watch with this ear better than with the other, while the whispered voice was heard at normal distance from both ears. After the operation for adenoid vegetations and consecutive intranasal treatment the nasal respiration became normal, and intelligence developed rapidly. He commenced to study better at school, and his memory improved.

Tonsillar Calculus.—W. G. A. ROBERTSON describes (*British Medical Journal*, January 7, 1899; *Philadelphia Medical Journal*, January 28, 1899) a case of a patient who had suffered from repeated attacks of tonsillitis, and in whom there was no history of a gouty tendency. The calculus, 42 x 36 millimetres in size and weighing almost an ounce, escaped from its bed in a fit of violent coughing.

Acute Suppurative Tonsillitis, with Convulsions.—ROGER K. HAMILTON reports (*British Medical Journal*, January 7, 1899; *Philadelphia Medical Journal*, January 28, 1899) a case of abruptly developing acute suppurative tonsillitis in a girl, aged seven years, and in which in less than twelve hours from its onset the right tonsil opened spontaneously and discharged pus. During the following day the child was restless and drowsy, and in the latter part of the day had a severe and distinct convulsive attack, lasting about five minutes.

Differential Diagnosis of Pharyngeal Syphilitic Lesions and Diphtheria.—DR. LEWIS S. SOMERS contributes a paper upon this subject (*Philadelphia Medical Journal*, January 28, 1899) and communicates a case of syphilitic mucous patches on both tonsils and the adjacent portion of the uvula of a man, aged forty-three years, illustrating a close resemblance to diphtheria.

He reports another case of tonsillar and pharyngeal ulcer resulting from the breaking down of a gummatous tumor of tertiary syphilis and simulating diphtheria, but to a less extent than in the previously recorded case.

Parasyphilitic Affections of the Larynx.—PROF. MASSEI, of Naples, contributes to the Jubilee number of the *Annales des Maladies de l'Oreille, du Larynx, etc.*, February, 1899, an admirable little article upon this subject. He alludes to a variety of affections which occur anatomically as the result of syphilitic lesions, without possessing in themselves any syphilitic elements and which are not to be treated by antisyphilitic remedies, but chiefly by surgical procedures when applicable; otherwise they often remain irremediable.

New Electric Snare for the Ablation of Adenoid Vegetations.—DR. J. GAREL (*Annales des Maladies de l'Oreille, du Larynx, etc.*, February, 1899)

describes and extols a snare recently devised by him for the removal of lymphoid hypertrophies and other growths from the vault of the pharynx.

It is a guarded snare, shaped on the model of Gottstein's curette, and, of course, acts automatically once the instrument is placed in position. There is no hemorrhage other than that produced by the contact of the instrument against the tissues.

This instrument can hardly ever be used upon children under nine or ten years of age.

Paralysis of the Inferior Laryngeal Nerve.—In the Physiological Section of the *Archiv für Anatomie und Physiologie*, 1899, PROF. H. KRAUSE, of Berlin, details some recent experiments upon animals which support Grossman's theory that the median position of the vocal bands in paralysis of this nerve is due entirely to the unimpaired function of the cricothyroid muscle.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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Food Poisoning.—An outbreak of meat poisoning due to imperfectly cooked veal pies is reported in detail by DRS. J. B. WILKINSON and HAROLD ASHTON, and has been the subject of considerable investigation and speculation by DR. HERBERT E. DURHAM (*Public Health*, January, 1899, and *British Medical Journal*, December 17, 1898). All the cases, somewhat over fifty in number, presented very similar symptoms, the chief of which were severe and uncontrollable vomiting and diarrhœa, accompanied at first by shivering, and followed by collapse. In some there were violent abdominal pains, and in several the abdomen was swollen and tender. Many had severe pains in the back. The symptoms began in from five to fourteen hours after eating, and, as a rule, were severe from the start. The motions were first grass-green, then dark green, and highly offensive. The severity of the diarrhœa increased on the second day; one patient was purged forty or more times in a single day. In very few cases the dejecta contained a little blood. In the worst cases the patients became semi-comatose, restless, and delirious in the course of a few hours. Occasionally there were disturbances of vision, which lasted until the temperature, which ranged from 100° in the mildest to 104.5° in the severest cases, became normal. The pulse was very rapid, weak, and dicrotic. In many cases the patient was markedly cyanotic and had some difficulty in breathing. Some had

cramps, and nearly all had muscular pain and stiffness. In very many cases herpes appeared about the lips on the third to the sixth day, and some had a rash, followed by desquamation. Convalescence in the severe cases was very prolonged; some were still weak, even after three and a half months. Four cases terminated fatally, and in two of these autopsies were secured. The brain surface showed slight congestion; the small intestines showed congested patches, which became larger and more numerous lower down, and did not correspond with Peyer's patches. The whole lower third was highly congested and contained blood and bloody mucus. The large intestine also was highly congested, and contained some yellow, diarrhœic fluid. Otherwise the organs of the body were found to be in a fairly healthy condition.

Investigation of the cause of the outbreak yielded the following facts: On Tuesday, July 26th, an apparently healthy calf was slaughtered, and two days later the forequarter and breast were delivered to a baker, who made the meat into the pies which were shown to be the cuuse of the outbreak. Other portions of the animal were sold to others who made pies which caused no trouble. A portion of a knuckle end, which was still in the possession of the butcher when the investigation was begun, was to all appearances perfectly good meat. The baker to whom the trouble was traced made, on the day he received the meat, 160 veal pies and 108 pork pies. The pastry was the same for the entire lot, and both kinds were treated to the same lot of jelly, which was made by boiling the veal bones with two pigs'-feet in four quarts of water. Inasmuch as the pork pies caused no disturbance of any kind, no responsibility could be attached to the pastry or to the jelly. The veal pies were baked in not less than three nor more than five batches, hence the batches would have included about thirty-two, forty, or fifty-three pies. The time occupied in baking each batch was said to be about twenty minutes. The number of persons affected was somewhat over fifty; and as in some cases single pies were shared by two, three, and four persons, it is obvious that less than fifty pies produced all the trouble. Since no other parts of the animal produced any sickness, there can be no doubt that the contamination of the meat occurred after the sale and delivery. According to the findings of Dr. Durham, based on a study of the blood of a number of the patients as to the behavior of the serum when tested for clumping properties with various micro-organisms, with controls of serum from normal persons, the outbreak was due to the bacillus enteritidis. This limitation of the inquiry was necessitated by the fact that it was impossible to secure either one of the pies or part of one or any of the first vomitings. The conclusion arrived at, strengthened by the fact that all four fatal cases were from pies which were two or more days old when eaten, which period allowed enormous multiplication, makes most probable the further conclusion that one whole batch was so insufficiently cooked as to preclude the killing of the organisms, which, according to Basenau, cannot survive exposure for one minute to a temperature of 70° C.

Another outbreak, which is likewise to be attributed to insufficient cooking of infected material, is recorded by Dr. F. W. Andrewes (*The Lancet*, January 7, 1899). In this the offending food was rice pudding, which caused eighty-six cases of diarrhœa in a single night in St. Bartholomew's Hospital,

the infecting agent being *bacillus enteritidis sporogenes*. Three different outbreaks of diarrhœa have occurred within recent years in this institution; the first and second involved fifty-nine and 146 patients, respectively; the third (the one under consideration), eighty-six. In all three epidemics the great majority of attacks have been mild—merely abdominal pain followed by a few loose movements. In a few of the more severe cases the discharges have contained mucus and blood. On each of the three occasions there were instances of abdominal pain alone and a general tendency to looseness of the bowels. In the first two outbreaks no special article of food could be incriminated, but the third was shown by many facts and coincidences to be due undoubtedly and incontestably to rice pudding, and to nothing else. In the first outbreak Klein found in the patients' stools a peculiar spore-bearing anaërobic bacillus, which he named *bacillus enteritidis sporogenes*, which most nearly resembles *bacillus butyricus*. It is intensely virulent when inoculated subcutaneously in guinea-pigs, and recent milk-cultures are the most virulent. It is a common saprophyte, and is probably consumed habitually in milk, in which it is very commonly detected, with no deleterious results; yet under certain unknown circumstances it becomes highly pathogenic. It was found in the stools of all those affected in the second outbreak and in the milk supplied on the day previous. In the third outbreak stools were taken from three patients at random, and were found to contain the organism. Cultures made in milk heated to 80° C. proved to be highly virulent. Guinea-pigs inoculated in the groin at the end of forty-eight hours with 1 c.c. of whey died in less than two days—one in twenty-one hours. All showed intense hemorrhagic œdema and gangrene spreading over the abdomen and thorax, and in all the organism was found in the blood and in the spleen. It was not possible to obtain any of the milk, as it had been used up or thrown away; but a part of a pudding was found and examined. It was sour in smell and acid to litmus; it yielded bacilli, which, while not so intensely virulent as those found in the stools, were, nevertheless, undoubtedly the same organism. Tests in the kitchen showed that the temperature reached in the preliminary preparation of the materials of the pudding ranged from 70° to 85° C., and in the final baking from 90° to 98° C., which is insufficient for killing the spores of the organism, which are among the most resistant known and can withstand a temperature of 100° C. for a considerable time.

Effect of Cider on Microbes.—Since cider is often adulterated with water which may be contamintaed with sewage, and hence may contain the typhoid organism, M. Bodin (*Revue Scientifique*, December 17, 1898) has made some experiments to determine whether these can live and preserve their virulence in that beverage. Cultures of the bacilli were treated with cider, and at the end of twelve to eighteen hours all were found to have been killed. As the organism, according to Berthelot, can develop in media as acid as cider, the question arises whether the destructive agent is not the aldehyde, which is always to be detected in some amount in beers, wines, and cider.

Disinfectant Properties of Ordinary Soaps.—According to Professor A. Serafini (*Archiv für Hygiene*, xxxiii. p. 369), who has been making a

study of the subject, soaps, whether hard or soft, possess a fairly high disinfectant power, which is not to be attributed either to the base or to the fatty acid, but to the resulting combination of the two. The free alkali content is ordinarily such that even in concentrated soap solutions it can exert no disinfecting action whatever. Since filtered and unfiltered soap solutions have the same power, it may be concluded that the disinfectant property resides alone in the soluble portions, and this property is naturally diminished by anything which tends to precipitate the soap from its solution. It is also influenced by temperature in two ways: first, by reason of the fact that disinfectants in general are more active at high temperature; and, second, that increase in temperature causes increased solubility. As the propetry is inherent in the salts of the fatty acids, anything which diminishes their relative amount, as foreign substances or high percentage of contained water, lessens the power of the soap to disinfect; hence the so-called rosin soaps which are very common in the market have proportionately less action the higher their percentage of salts of the rosin acids.

In the ordinary washing of clothes soaps can exert but little disinfection, because of the many factors which cause a diminution of their power, among which the hardness of the water is one of the most important. In general, if one is obliged by lack of other means, or on account of economy, to employ soap in the practice of disinfection, it is best to avoid soft soaps, since they contain a large amount of water, besides glycerin and all the impurities of the fats and alkali from which they are made—objections which do not apply in the same degree to hard soaps. One will do well to distrust the ordinary colored soaps, especially the green, yellow, and brown, which are more than likely to contain rosin. Those on which one may most safely depend are the hard white and marbled Marseilles, or castile soaps, since they contain no rosin and but little water. If soaps must be employed as disinfectants they should be used in concentrated solutions at a temperature of 30°–40° C., and the objects treated should be immersed a number of hours therein.

Tuberculous Meat.—According to the official returns of the Leipzig abattoir for 1897, 36.40 per cent. of the 27,191 cattle slaughtered were more or less tuberculous. Nearly half (48.09 per cent.) of the cows were affected, while but a fifth (20.49 per cent.) of the bullocks and heifers gave evidence of the disease. Notwithstanding the large number of infected animals, only 2.08 per cent. were totally condemned as food. Of those more or less infected but passed as fit for food—that is, 97.92 per cent., all but a very small number were allowed to be sold without any restrictions after the removal of the organs affected. The balance, 5.73 per cent., were first sterilized or sold as of second quality. Only eight sheep out of 49,559 were tuberculous. Of the swine, 132,062 in number, 2.78 per cent., and of the calves, 67,961 in number, 0.20 per cent., were more or less diseased.

Scarlet Fever in Swine.—The disease known as rothlauf in Germany, and rouget in France, is in England (and America?) often called pig scarlatina, on account of the bright-red eruption on the skin; but incorrectly so, since the constant presence of lesions of the intestine show it to be a disease *sui*

generis, and more akin to typhoid. But BEHLE has reported a remarkable and, so far as we know, unprecedented instance of the participation of swine in an outbreak of scarlatina in Germany. He states that while the children at a number of farm-houses and cottages were suffering from scarlatina of a severe type, the pigs were attacked by a highly infectious and fatal fever, the symptoms and post-mortem appearances of which were identical with those of scarlatina in man, viz., angina, erythema, followed, in those that recovered, by desquamation, œdema of the extremities, albuminuria, uræmia, and acute nephritis. A healthy animal at a house where none of the family had been attacked, having been inoculated with the blood of a child suffering from scarlet fever, died at the end of a week with symptoms and lesions indistinguishable from those of the human disease and from those of the pigs that had presumably contracted it from the inhabitants, though whether through actual contact or, as is highly probable under the conditions of village life, through the ingestion of their excreta, we have no means of knowing.

[There is little doubt that cows are susceptible to scarlatina and that the disease may be reconveyed to man by the consumption of their milk, but owing to histological differences the external appearances are greatly modified. The susceptibility of any of the lower animals to diseases proper to man, as of rats to the plague and of cats to diphtheria, is of great interest not only from a purely scientific stand-point, and as bearing on the propagation of the infection, but as affording opportunities of studying the etiology and prophylaxis of the disease *in corpore vili*. This can be done most satisfactorily when the character of the skin, etc., permits of the morbid processes taking the same appearances, which is rarely the case. One cannot reasonably expect a finely punctated erythema on the hairy hide of the cow, and it is impossible to imagine the eruptions of scarlatina or the pustules of smallpox on that of an elephant or rhinoceros, though one may conceive of these animals being susceptible to the virus.—E. F. W.]

PATHOLOGY AND BACTERIOLOGY.

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Scarlet Fever.—PEARCE ("Scarlet Fever: Its Pathology, Histology, and Bacteriology," *Medical and Surgical Reports, Boston City Hospital*, 1899) has made thorough gross, histological, and bacteriological examinations in twenty-one cases of scarlet fever in which a complete post-mortem examination was possible. Nothing was observed which would indicate the etiology of the disease.

The only constant gross change found was a hyperplasia of the lymphoid tissue in every part of the body. This hyperplasia was found not only in the large subcutaneous and mesenteric lymph-nodes, but also in the small lymph-nodules of the mucous membranes. It was particularly prominent in the Peyer's patches and solitary lymph-nodules of the intestine.

A false membrane on the tonsil was seen in a few cases. This membrane was always due to the streptococcus.

The micro-organisms producing secondary inflammatory lesions were, in the order of their frequency, the streptococcus pyogenes, the staphylococcus pyogenes aureus, and the pneumococcus. The streptococcus was also found most frequently in the general infections and on the mucous membrane of the throat and nose.

The more important inflammatory complications observed were acute inflammation of the middle ear, with or without extension to the mastoid cells; suppuration of cervical lymph-nodes; acute pleuritis; inflammation of the antrum of Highmore. The less frequent complications were abscess of the lung; ulceration and abscess-formation of the upper respiratory tract; acute endocarditis; inflammation of the sphenoidal sinus, and metastatic abscesses of the kidney.

Of these inflammations the antrum of Highmore is the most interesting. It was found in three out of the four cases in which the accessory sinuses of the nose were examined by the Harke method. The most common complications were broncho-pneumonia and suppuration of the middle ear, each of which occurred in eight cases.

The histological report, which forms the bulk of the paper, is very complete. Thirty-two different organs and tissues were examined. The histological examination of the skin, tongue, and mucous membrane of the mouth and pharynx showed the changes in these tissues to be inflammatory rather than vasomotor. The most marked changes were seen from the fifth to the ninth days. The bloodvessels were congested, the lymphatics dilated, and the epithelial and subcutaneous tissues, particularly the former, infiltrated with large numbers of polymorphonuclear leucocytes. The changes were most marked in the tongue, particularly in the papillæ, a fact which explains the prominence of these bodies seen clinically.

The lesions in the gastro-intestinal tract consisted in degenerative changes in the epithelium and of proliferative and degenerative processes in the lymph-nodules similar to those in lymphoid tissue elsewhere.

The changes in the heart-muscle were fatty degeneration and fragmentation.

In the liver two forms of focal lesions occurred. One was due to accumulations of phagocytic cells in the capillaries, leading to occlusion of the vessels and to necrosis of the included liver-cells, and might occur in any part of the lobule. The other was due to a necrosis of liver-cells in the centres of the lobules, followed by an infiltration with leucocytes.

The changes in the spleen consisted of proliferation of the endothelial cells in the centres of the Malpighian bodies and of the endothelial cells lining the blood sinuses. In the lymph-nodes generally a similar proliferation was observed in the lymph-nodules and lymph-sinuses. These newly-formed cells were generally markedly phagocytic. There also occurred in the

spleen and lymphoid tissue generally an abundant formation of plasma cells from lymphoid cells. In some cases large numbers of plasma and lymphoid cells were found in the veins of the spleen just beneath the endothelium.

From a study of the kidneys of these cases the writer concludes that acute interstitial nephritis is the most important early renal lesion of scarlet fever. It was well marked in four cases, dying late in the second or early in the third week of the disease. In four other cases slight interstitial changes were noted. No glomerular lesions were found. This may be explained by the fact that of the cases examined only one died after the sixteenth day.

The most marked cell change observed was the production of plasma cells in the spleen, lymph-nodes, and lymphoid tissue generally throughout the body. In certain cases these cells were present in large numbers in the circulation and in the tissues of the kidney and lung—a process analogous to the one mentioned by Councilman as occurring in diphtheria. A less frequent cell change was the production of phagocytic cells from the endothelium of lymphoid tissue generally and from the endothelium lining the lymph-sinuses of the lymph-nodes, and the bloodvessels of the spleen and liver—a process which, although less marked, is analogous to the general proliferative changes described by Mallory as occurring in typhoid fever.

The paper is illustrated by twelve photomicrographs, of which those indicating the changes in the tongue, the veins of the spleen, the kidney, and the lymph-nodules of the stomach are the most interesting.

The writer has collected all references to the cell changes of scarlet fever. From these it would appear that, with the exception of the kidney, little work has been done on the histology of the disease.

Subcutaneous Abscesses due to Typhoid Bacillus. — PRATT (*Ibid.*) reports two cases of invasion of the subcutaneous tissues by the bacillus typhosus. In one case an abscess formed over the right olecranon one month after typhoid fever. At the operation no connection was found with the joint or periosteum. In a second case of typhoid fever a purplish, indurated swelling formed on the leg a few days before death. It contained a sero-sanguineous fluid, from which the bacillus typhosus was isolated in pure culture. In the literature he found three cases of abscesses in the subcutaneous tissue and six in muscle-tissue. From an analysis of all the cases he draws the following conclusions: Abscesses in the soft parts due to the bacillus typhosus are usually single. They appear during the latter weeks of fever or early in convalescence. They run an acute course. In this respect they contrast strongly with post-typhoid bone lesions, whose course is characterized by chronicity and a marked tendency to recurrence. They produce few constitutional symptoms. They heal rapidly after incision.

Gonorrhœal Septicæmia and Ulcerative Endocarditis.—THAYER and LAZEAR (*Journal of Experimental Medicine*, January, 1899) add to the literature the report of another case of the above condition, and review the subject of secondary gonorrhœal infections.

In 1895 Thayer and Blumer reported a case of ulcerative endocarditis in which they obtained during life a pure culture of the gonococcus from the

blood. At the autopsy the same micro-organism was found in the thrombi upon the mitral valve. The organisms did not grow upon agar-agar and ox-blood serum used as culture media. In the uterus and vagina characteristic gonococci were found.

Previous to this observation nearly a score of cases of acute ulcerative endocarditis had been reported as occurring in the course of gonorrhœa. In several of these cocci, corresponding to the morphology and staining characteristics of gonococci, were found in smears from the valves, but were not grown on culture media.

Thayer and Blumer, by their cultures taken during life, were the first to demonstrate a gonococcal septicæmia.

In the case which Thayer and Lazear now report, the gonococcus was obtained in pure culture on three of the four days immediately preceding death. Two c.cm. of blood were drawn from the median basilic vein and mixed with 4 c.cm. of agar-agar. The growth appeared after forty-eight hours and was abundant. Transplanted upon human blood-serum there was a growth; upon ox-blood serum, gelatin, and bouillon, none.

At the autopsy was found a subacute ulcerative and vegetative tricuspid endocarditis, acute sero-purulent pleuritis and pericarditis, a pulmonary infarct, and subacute hemorrhagic glomerular nephritis. Diplococci corresponding to the gonococcus in morphology and staining reaction were found in smears from the urethra, the vegetations of the tricuspid valve, and the pleural and pericardial exudate. Upon human blood-serum a growth of the gonococcus was obtained from the tricuspid valve, pericardial exudate, and heart's blood.

The writers conclude their report with a review of thirty-two cases in which satisfactory pathological records were made of gonorrhœa with fatal cardiac complications. Of these thirty-one were cases of ulcerative endocarditis and one of perimyocarditis alone.

In many of these micro-organisms corresponding to the gonococcus were found in the vegetations. In three the gonococcus was obtained after death in cultures from the vegetations. In one of these three cases a piece of softened thrombus introduced into the human urethra produced in four days a characteristic gonorrhœa with gonococci in the discharge (Lenharz).

Finally, in Thayer's two cases the gonococcus has been obtained in cultures from the blood during life.

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